IDAHO COUNTY, IDAHO

MULTI-HAZARD MITIGATION PLAN

2015

REVISION

DRAFT

Prepared By

Northwest Management, Inc.

Foreword

"Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation activities may be implemented prior to, during, or after an incident. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs."[1]

The **Idaho County, Idaho Multi - Hazard Mitigation Plan** was updated in 2014-15 by the Idaho County MHMP planning committee in cooperation with Northwest Management, Inc. of Moscow, Idaho.

This Plan satisfies the requirements for a local multi-hazard mitigation plan and flood mitigation plan under 44 CFR Part 201.6 and 79.6.

[1] Federal Emergency Management Agency. "Local Multi-Hazard Mitigation Planning Guidance." July 1, 2008.

Table of Contents

Foreword **1**

Chapter 1 – Plan Overview **7**

Overview of this Plan and its Development **7**

Phase I Hazard Assessment *8*

Goals and Guiding Principles *10*

Chapter 2 – Planning Process **20**

Documenting the Planning Process **20**

The Planning Team *20*

Description of the Planning Process *20*

Planning Committee Meetings *22*

Public Involvement *23*

Documented Review Process *29*

Plan Monitoring and Maintenance *29*

Chapter 3 – Community Profile **33**

Idaho County Characteristics **33**

Description of the Region *34*

Natural Resources *37*

Hazard Management Capabilities *40*

Regional Hazard Profile *41*

Chapter 4 – Flood **46**

Regional and Local Hazard Profile **46**

Jurisdictional Risk and Vulnerability Assessment **50**

Idaho County Annex *51*

Individual Community Assessments **60**

City of Grangeville *60*

City of Ferdinand *65*

City of Cottonwood *67*

City of Riggins *70*

City of Stites *74*

City of Kamiah *78*

City of Kooskia *83*

City of White Bird *87*

Chapter 5 – Earthquake **93**

Regional and Local Hazard Profile **93**

Jurisdictional Risk and Vulnerability Assessment **97**
Idaho County Annex *97*
Individual Community Assessments **101**
City of Grangeville *101*
City of Ferdinand *102*
City of Cottonwood *103*
City of Riggins *104*
City of Stites *104*
City of Kamiah *105*
City of Kooskia *106*
City of White Bird *107*
Chapter 6 – Landslide **110**
Regional and Local Hazard Profiles **110**
Jurisdictional Risk and Vulnerability Assessment **113**
Idaho County Annex *113*
Individual Community Assessments **119**
City of Grangeville *119*
City of Ferdinand *120*
City of Cottonwood *121*
City of Riggins *121*
City of Stites *123*
City of Kamiah *125*
City of Kooskia *127*
City of White Bird *129*
Chapter 7 – Severe Weather **134**
Regional and Local Hazard Profiles **134**
Jurisdictional Risk and Vulnerability Assessment **140**
Idaho County Annex *140*
Individual Community Assessments **150**
City of Grangeville *150*
City of Ferdinand *151*
City of Cottonwood *153*
City of Riggins *155*
City of Stites *157*
City of Kamiah *159*
City of Kooskia *160*
City of White Bird *162*
Chapter 8 – Wildland Fire **167**

Regional and Local Hazard Profiles **167**

Jurisdictional Risk and Vulnerability Assessments **180**
Idaho County Annex *180*

Individual Community Assessments **190**
City of Grangeville *190*
City of Ferdinand *193*
City of Cottonwood *196*
City of Riggins *199*
Cities of Kooskia and Stites *202*
City of Kamiah *207*
City of White Bird *211*

Chapter 9 – Mitigation Strategy **218**

Administration and Implementation of Action Items **218**
Mechanisms to Incorporate Mitigation Strategies *218*
Prioritization of Action Items *238*

Jurisdictional Mitigation Strategies **239**
Idaho County Annex *239*
City of Grangeville Annex *266*
City of Ferdinand Annex *273*
City of Cottonwood Annex *279*
City of Riggins Annex *286*
City of Stites Annex *292*
City of Kamiah Annex *297*
City of Kooskia Annex *304*
City of White Bird Annex *309*
Proposed Defensible Space Projects *316*
Proposed Roadside Fuel Reduction Projects *318*

List of Tables and Figures **320**
List of Tables *320*
List of Figures *322*

Chapter 1

Plan Overview

IN THIS SECTION:

- Planning Participants
- Phase I Hazard Assessment
- Goals and Guiding Principles
- Integration with Other Planning Mechanisms

This Page Intentionally Left Blank

Chapter 1 – Plan Overview

Overview of this Plan and its Development

This regional Multi - Hazard Mitigation Plan is the result of analyses, professional cooperation and collaboration, assessments of hazard risks and other factors considered with the intent to reduce the potential for hazards to threaten people, structures, infrastructure, and unique ecosystems in Idaho County, Idaho. The Idaho County Multi-Hazard Mitigation Plan was originally approved by Idaho Bureau of Homeland Security and the Federal Emergency Management Agency in January 2009. This document serves as the required 5-year update of the Multi-Hazard Mitigation Plan under the Pre-Disaster Mitigation program and will be in effect until 2020. This update will also include the County's Community Wildfire Protection Plan update as a chapter within the main document. This is a pilot project between the Idaho Bureau of Homeland Security, Idaho Department of Lands, and Idaho County and is one of the first in the state. This document assists with the identification and assessment of various potential hazards and helps maintain the County's eligibility for grants and other funding.

The planning team responsible for implementing this project was led by the Idaho County Disaster Management Coordinator. Agencies and organizations that participated in the planning process included:

- Elk City Volunteer Fire Department
- Cottonwood Police Department
- Kooskia Fire Department
- Glenwood-Caribel Fire/Quick Response Unit
- BPC Rural Fire District
- Harpster Fire Protection District
- St. Mary's Ambulance Services
- Western Governors' University
- Camas Prairie Amateur Radio
- Public Health Idaho North Central District
- Northwest Management, Inc.
- Idaho County Disaster Management
- North Idaho Correctional Institute
- Grangeville Volunteer Fire Department
- Sundance Services
- Alternative Nursing Services
- Grangeville Police Department
- Idaho County citizens/business
- Syringa Hospital and Ambulance
- Idaho County Free Press
- Civil Air Patrol
- Keuterville Highway District
- Idaho County Sheriff's Office
- Idaho Department of Lands
- Idaho Bureau of Homeland Security
- United States Forest Service

In the fall of 2014, Idaho County Disaster Management contracted services to update the Idaho County Multi-Hazard Mitigation Plan to Northwest Management, Inc. of Moscow, Idaho.

Phase I Hazard Assessment

The Multi - Hazard Mitigation Plan is developed in accordance with the requirements of the Federal Emergency Management Agency (FEMA) and Idaho Bureau of Homeland Security for a county level pre-disaster mitigation plan. The State of Idaho Hazard Mitigation Plan identifies eleven natural hazards affecting the State. In an effort to be consistent, the planning committee chose 5 natural and 4 anthropogenic annexes from the state identified natural hazards that pose the highest risk for Idaho County. The hazards addressed in this Plan are:

- Flood
- Earthquake
- Landslide
- Severe Weather
- Wildland Fire
- Hazardous Materials
- School Violence
- Cyber Terrorism
- Terrorism and Civil Unrest

Additional hazard annexes may be added to this Plan as funding allows. The highest priority hazards to be considered for future evaluation are:

- Extended Power Outage
- Dam Failure
- Pandemic

A Phase I Assessment was facilitated with the county planning committee to determine the relative frequency of a hazard's occurrence and the potential impact a hazard event will have on people, property, infrastructure, and the economy based on local knowledge of past occurrences. A matrix system with hazard magnitude on the x axis and frequency on the y axis was used to score each hazard.

Magnitude of Hazards						
Value	**Reconstruction Assistance From**	**Geography (Area) Affected**	**Expected Bodily Harm**	**Loss Estimate Range**	**Population Sheltering Required**	**Warning Lead Times**
1	Family	Parcel	Little to No Injury / No Death	$1000s	No Sheltering	Months
2	City	Block or Group of Parcels	Multiple Injuries with Little to No Medical Care / No Death	$10,000s	Little Sheltering	Weeks
2	County	Section or Numerous Parcels	Major Medical Care Required / Minimal Death	$100,000s	Sheltering Required Neighboring Counties Help	Days
4	State	Multiple Sections	Major Injuries / Requires Help from Outside County / A Few Deaths	$1,000,000s	Long Term Sheltering Effort	Hours
8	Federal	Countywide	Massive Casualties / Catastrophic	$10,000,000s	Relocation Required	Minutes

A scoring system (shown above) was used to categorize the relative magnitude each hazard may have on the community. Frequency was rated as "High" for hazards occurring multiple times per year during a 5 year period, "Medium" for hazards occurring every 5 to 25 years, or "Low" for hazards occurring more than 25 years apart.[2]

The following table summarizes the results of the Phase I Hazard Assessments for Idaho County. With the exception of wildland fires, the 2015 planning committee changed the remaining original hazards. Earthquake, severe weather, and terrorism & civil unrest all increased in magnitude in the update plan. The two original hazards that increased in frequency in the 2015 plan included terrorism & civil unrest, and landslide. The flood hazard decreased in magnitude in the updated plan. School violence and hazardous materials spills are new hazards that have been ranked by the 2015 committee.

[2] Custer County, Idaho. Scoring system partially adapted from the Custer County Multi-Jurisdiction All Hazard Mitigation Plan. 2008. Pp 165-168.

Frequency		Magnitude: Low	Magnitude: Medium	Magnitude: High
Frequency	Low		**Earthquake Terrorism/Civil unrest**	
	Medium			**School violence**
	High		**Flood**	**Wildfire Landslide Severe Weather Hazmat Spill**

The inclusion of additional hazards was considered; however, due to funding limitations, participating jurisdictions chose not to assess technological or other hazards until additional funding becomes available. At such a time, the Multi - Hazard Mitigation Plan will be revised to include hazards such as extended power outage, dam failure, and pandemic.

Goals and Guiding Principles

Federal Emergency Management Agency Philosophy

Effective November 1, 2004, a Multi - Hazard Mitigation Plan approved by the Federal Emergency Management Agency (FEMA) is required for Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Program (PDM) eligibility. The HMGP and PDM programs provide funding, through state emergency management agencies, to support local mitigation planning and projects to reduce potential disaster damages.

The new local Multi - Hazard Mitigation Plan requirements for HMGP and PDM eligibility is based on the Disaster Mitigation Act of 2000, which amended the Stafford Disaster Relief Act to promote an integrated, cost effective approach to mitigation. Local Multi - Hazard Mitigation Plans must meet the minimum requirements of the Stafford Act-Section 322, as outlined in the criteria contained in 44 CFR Part 201. The plan criteria cover the planning process, risk assessment, mitigation strategy, plan maintenance, and adoption requirements.

In order to be eligible for project funds under the Flood Mitigation Assistance (FMA) program, communities are required under 44 CFR Part 79.6(d)(1) to have a mitigation plan that addresses flood hazards. On October 31st, 2007, FEMA published amendments to the 44 CFR Part 201 at 72 Federal Reg. 61720 to incorporate mitigation planning requirements for the FMA program (44 CFR Part 201.6). The revised Local Mitigation Plan Review Crosswalk (October 2011) used by FEMA to evaluate local hazard mitigation plans is consistent with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by Section 322 of the Disaster Mitigation Act of 2000, the National Flood Insurance Act of 1968, as amended by the National Flood Insurance Reform Act of 2004 and 44 Code of Federal Regulations (CFR) Part 201 – Mitigation Planning, inclusive of all amendments through July 1, 2008, was used as the official guide for development of a FEMA-compatible Idaho County, Idaho Multi-Hazard Mitigation Plan. [3]

FEMA will only review a local Multi - Hazard Mitigation Plan submitted through the appropriate State Hazard Mitigation Officer (SHMO). Draft versions of local Multi - Hazard Mitigation Plans will not be reviewed by FEMA. FEMA will review the final version of a plan prior to local adoption to determine if the plan meets the criteria, but FEMA will be unable to approve it prior to adoption.

In Idaho the SHMO is:

Idaho Bureau of Homeland Security
4040 Guard Street, Bldg 600
Boise, ID 83705

A FEMA designed plan will be evaluated on its adherence to a variety of criteria, including:

- Adoption by the Local Governing Body
- Multi-jurisdictional Plan Adoption
- Multi-jurisdictional Planning Participation
- Documentation of Planning Process
- Identifying Hazards
- Profiling Hazard Events
- Assessing Vulnerability: Identifying Assets
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends
- Multi-jurisdictional Risk Assessment
- Local Hazard Mitigation Goals
- Identification and Analysis of Mitigation Measures
- Implementation of Mitigation Measures
- Multi-jurisdictional Mitigation Strategy
- Monitoring, Evaluating, and Updating the Plan
- Implementation Through Existing Programs
- Continued Public Involvement

United States Government Accountability Office (GAO)

Since 1984, wildland fires have burned an average of more than 850 homes each year in the United States and, because more people are moving into fire-prone areas bordering wildlands, the number of homes at risk is likely to grow. The primary responsibility for ensuring that preventative steps are taken to protect

[3] Federal Emergency Management Agency. "Local Multi-Hazard Mitigation Planning Guidance." July 1, 2008.

homes lies with homeowners. Although losses from fires made up only 2.2 percent of all insured catastrophic losses from 1991 to 2010[4], fires can result in billions of dollars in damages.

GAO was asked to assess, among other issues, (1) measures that can help protect structures from wildland fires, (2) factors affecting use of protective measures, and (3) the role technology plays in improving firefighting agencies' ability to communicate during wildland fires.

The two most effective measures for protecting structures from wildland fires are: (1) creating and maintaining a buffer, called defensible space, from 30 to 100 feet wide around a structure, where flammable vegetation and other objects are reduced; and (2) using fire-resistant roofs and vents. In addition to roofs and vents, other technologies – such as fire-resistant windows and building materials, surface treatments, sprinklers, and geographic information systems mapping – can help in protecting structures and communities, but they play a secondary role.

Although protective measures are available, many property owners have not adopted them because of the time or expense involved, competing concerns such as aesthetics or privacy, misperceptions about wildland fire risks, and lack of awareness of their shared responsibility for fire protection. Federal, state, and local governments, as well as other organizations, are attempting to increase property owners' use of protective measures through education, direct monetary assistance, and laws requiring such measures. In addition, some insurance companies have begun to direct property owners in high risk areas to take protective steps[5].

State and Federal CWPP Guidelines

This Community Wildfire Protection Plan includes compatibility with FEMA requirements for a Hazard Mitigation Plan, while also adhering to the guidelines proposed in the National Fire Plan, and the Healthy Forests Restoration Act (2003). This Community Wildfire Protection Plan has been prepared in compliance with:

- The National Fire Plan: A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (December 2006).
- Healthy Forests Restoration Act (2003).
- National Cohesive Wildland Fire Management Strategy (March 2011). The Cohesive Strategy is a collaborative process with active involvement of all levels of government and non-governmental organizations, as well as the public, to seek national, all-lands solutions to wildland fire management issues.
- The Federal Emergency Management Agency's Region 10 guidelines for a Local Hazard Mitigation Plan as defined in 44 CFR parts 201 and 206, and as related to a fire mitigation plan chapter of a Multi-Hazard Mitigation Plan.

---

[4] Rocky Mountain Insurance Information Association website at, http://www.rmiia.org/Catastrophes_and_Statistics/Wildfire.asp accessed in November, 2013.

[5] United States Government Accountability Office. Technology Assessment – Protecting Structures and Improving Communications during Wildland Fires. Report to Congressional Requesters. GAO-05-380. April 2005.

- National Association of State Foresters – guidance on identification and prioritizing of treatments between communities (2003).

Update and Review Guidelines[6]

- *Deadlines and Requirements for Regular Plan Reviews and Updates*: In order to apply for a FEMA PDM project grant, Tribal and local governments must have a FEMA-approved mitigation plan. Tribal and local governments must have a FEMA-approved mitigation plan in order to receive HMGP project funding for disasters declared on or after November 1, 2004. States and Tribes must have a FEMA-approved Standard or Enhanced Mitigation Plan in order to receive non-emergency Stafford Act assistance (i.e., Public Assistance categories C-G, HMGP, and Fire Management Assistance Grants) for disasters declared on or after November 1, 2004. State mitigation plans must be reviewed and reapproved by FEMA every three years. Local Mitigation Plans must be reviewed and reapproved by FEMA every five years.

- *Plan updates*. In addition to the timelines referenced above, the Rule includes the following paragraphs that pertain directly to the update of State and local plans,
  - ✓ §201.3(b)(5) [FEMA Responsibilities]…Conduct reviews, at least once every three years, of State mitigation activities, plans, and programs to ensure that mitigation commitments are fulfilled….
  - ✓ §201.4(d) Review and updates. [State] Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities and resubmitted for approval…every three years.
  - ✓ §201.6(d) [Local] plans must be reviewed, revised if appropriate, and resubmitted for approval within five years in order to continue to be eligible for project grant funding.

Plan updates must demonstrate that progress has been made in the past three years (for State plans), or in the past five years (for local plans), to fulfill commitments outlined in the previously approved plan. This will involve a comprehensive review and evaluation of each section of the plan and a discussion of the results of evaluation and monitoring activities detailed in the Plan Maintenance section of the previously approved plan. FEMA will leave to State discretion, consistent with this plan update guidance, the documentation of progress made. Plan updates may validate the information in the previously approved plan, or may involve a major plan rewrite. In any case, a plan update is NOT an annex to the previously approved plan; it must stand on its own as a complete and current plan.

The objective of combining these complementary guidelines is to facilitate an integrated wildland fire risk assessment, identify pre-hazard mitigation activities, and prioritize activities and efforts to achieve the protection of people, structures, the environment, and significant infrastructure in Idaho County while facilitating new opportunities for pre-disaster mitigation funding and cooperation.

[6] Federal Emergency Management Agency. Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000. Original Release March, 2004 With revisions November, 2006, June, 2007 & January 2008.

Planning Philosophy and Goals

Idaho County Planning Philosophy

This effort will utilize the best and most appropriate science from all partners and will integrate local and regional knowledge about natural hazards while meeting the needs of local citizens and the regional economy.

Mission Statement

To make Idaho County residents, communities, state agencies, local governments, and businesses less vulnerable to the effects of natural and man-made hazards through the effective administration of hazard mitigation grant programs, hazard risk assessments, wise and efficient infrastructure hardening, and a coordinated approach to mitigation policy through federal, state, regional, and local planning efforts. Our combined prioritization will be the protection of people, structures, infrastructure, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy.

Jurisdictional Planning and Mitigation Goals

As part of the 2014-15 revision process, each participating jurisdiction in Idaho County was asked to develop its own set of planning and mitigation goals to help reflect and keep track of individual priorities and changes in hazard vulnerability over time. During the first planning committee meeting, the group discussed several overall short-term and long-term goals as well as goals for the planning process itself. Members of the committee were given a list of example goals statements and a blank goals worksheet to fill out and return. The following section outlines the goals submitted by each jurisdiction.

Idaho County:

1. This planning process will involve planning for both manmade and natural hazards of Flood, Earthquake, Landslides, Wildland Fire (excerpted from existing CWPP), Severe Weather, and Terrorism & Civil Unrest;
2. Additional hazards will be added to this plan as pre-mitigation planning is completed in the future;
3. Prioritize the protection of people, structures, infrastructure, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy;
4. Educate communities about the unique challenges of natural hazard preparedness in the county;
5. Reduce the impact of hazard events and potential losses incurred by both public and private residents and entities;
6. Consider land use policies to alleviate potential hazard risks and impacts for future development;
7. Improve enrollment in the National Flood Insurance Program within communities that are at risk to floods through increased outreach and education;
8. Establish mitigation priorities and develop mitigation strategies in Idaho County;
9. Strategically locate and plan infrastructure and fuels reduction projects that take into consideration the impacts of natural hazards;

10. Reduce the area of wildland-urban interface (WUI) land burned and losses experienced because of wildland fires where these fires threaten communities in the wildland-urban interface;
11. Provide recommendations for alternative treatment methods, such as brush density, herbicide treatments, fuel reduction techniques, and disposal or removal of treated fuels; and
12. Meet or exceed the requirements of the National Fire Plan and FEMA Multi - Hazard Mitigation Plan and Community Wildfire Protection Plan.

Integration with Other Local Planning Mechanisms

During the development of this Multi - Hazard Mitigation Plan several planning and management documents were reviewed in order to avoid conflicting goals and objectives. Existing programs and policies were reviewed in order to identify those that may weaken or enhance the hazard mitigation objectives outlined in this document. The following narratives help identify and briefly describe some of the existing planning documents and ordinances considered during the development of this plan. This list does not necessarily reflect every plan, ordinance, or other guidance document within each jurisdiction; however, this is a summary of the guidance documents known to and recommended for review by members of the planning committee.

Threat and Hazard Identification and Risk Assessment

The intent of Threat and Hazard Identification and Risk Assessment (THIRA) is to identify and assess local risks, the associated, potential impacts on residents, property and the environment and determine capabilities required to effectively define community protection measures and response capabilities.

North Idaho Correctional Institution Facility Risk Assessment

The purpose of the North Idaho Correctional Institution's (NICI) Facility Risk Assessment is to 1) promote sensitivity to the scope of potential threats which could compromise the safe and secure operation of all Idaho Department of Correction facilities and community work centers, 2) provide a sense of what threats require the prioritized appropriation of Department of Correction resources, 3) assess the current facility and community work center emergency preparedness, and 4) to provide guidance as the department's emergency preparedness process evolves.

NICI's Facility Risk Assessments provides valuable information that will be incorporated into the risk assessments completed during the MHMP planning process.

City of Cottonwood Emergency Plan

The City of Cottonwood Emergency Plan addresses the city's operational plan in the event of several potential disasters and emergencies such as a North Idaho Correctional Institution escape, a structural or wildland fire, and loss of water supply as well as other disasters. The Plan offers basic guidelines regarding the city's response and jurisdictional control.

It is anticipated that the Multi – Hazard Mitigation Plan will support the City of Cottonwood Emergency Plan. The hazard assessments conducted during the MHMP planning process may help identify additional hazards and will support the improvement of the city's response capability.

Nez Perce Reservation Emergency Operations Plan

The Nez Perce Reservation Emergency Operations Plan outlines the policies and concepts that guide response at the local level in response to, and recovery from natural and man-caused disasters. The Emergency Operations Plan describes an array of tribal responses and efforts to save lives, limit human suffering, and protect public health, safety, and property, including wildlife, natural resources, the environment, and local economy from the damaging effects of natural and man-caused disaster emergencies.

It is anticipated that the Multi – Hazard Mitigation Plan will support the Nez Perce Reservation Emergency Operations Plan. The hazard assessments conducted during the MHMP planning process may help identify additional hazards and will support the improvement of the tribe's response capability.

Idaho County Flood Damage Prevention Ordinance #36

The Board of Idaho County Commissioners adopted the Flood Damage Prevention Ordinance #36 in April of 1997 with the intent of promoting public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to protect human life and health, minimize expenditure of public money and costly flood control projects, minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public, minimize prolonged business interruption, minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in areas of special flood hazard, help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas, ensure that potential buyers are notified that property is in an area of special flood hazard, and ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

This Multi-Hazard Mitigation Plan supports Ordinance #36 by the Board of County Commissioners as a preventative measure for reducing potential flood losses.

City of Riggins Flood Damage Prevention Ordinance #133

The City of Riggins adopted Ordinance #133 in February of 1997 with the intent to promote public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas as identified by the Federal Insurance Administration. This ordinance establishes that a development permit shall be obtained before construction or development begins with any area of special flood hazard. General and specific standards for construction, anchoring, utilities, manufactured homes, subdivisions, and floodways were also established in order to reduce the flood hazard.

This Multi-Hazard Mitigation Plan supports Ordinance #133 by the City of Riggins as a preventative measure for reducing potential flood losses.

North Idaho Correctional Institution Facility Risk Assessment

The purpose of the North Idaho Correctional Institution's (NICI) Facility Risk Assessment is to 1) promote sensitivity to the scope of potential threats which could compromise the safe and secure operation of all Idaho Department of Correction facilities and community work centers, 2) provide a sense of what threats require the prioritized appropriation of Department of Correction resources, 3) assess the current facility and community work center emergency preparedness, and 4) to provide guidance as the department's emergency preparedness process evolves.

NICI's Facility Risk Assessments provides valuable information that will be incorporated into the risk assessments completed during the MHMP planning process.

Idaho County Threat and Hazard Identification and Risk Assessment (2014)

The intent of Threat and Hazard Identification and Risk Assessment (THIRA) is to identify and assess local risks, the associated, potential impacts on residents, property and the environment and determine capabilities required to effectively define community protection measures and response capabilities.

Idaho County Revised Wildland-Urban Interface Wildland Fire Mitigation Plan (revised 2009)

This **Revised Wildland-Urban Interface Wildland Fire Mitigation Plan** for Idaho County, Idaho, is an update of the **October 11, 2005 Wildland Urban Interface Fire Mitigation Plan for Idaho County,** and incorporates the **2007 Update Addendum** (August 1st, 2007) and recent information provided by agencies and organizations involved in the original development of this plan.

This **Revised Wildland-Urban Interface Wildland Fire Mitigation Plan** is the result of analyses, professional cooperation and collaboration, assessments of wildfire risks and other factors considered with the intent to reduce the potential for wildfires to threaten people, structures, infrastructure, and unique ecosystems in Idaho County, Idaho. The Idaho County Commissioners led the Idaho County *Fire Mitigation Working Group*, also known as the planning committee, responsible for implementing this project.

Chapter 2

Planning Process

IN THIS SECTION:

- Description of the Planning Process
- Planning Committee Meetings
- Public Involvement
- Documented Review Process
- Plan Monitoring and Maintenance

This Page Intentionally Left Blank

Chapter 2 – Planning Process

Documenting the Planning Process

Documentation of the planning process, including public involvement, is required to meet FEMA's DMA 2000 (44CFR§201.6(b) and §201.6(c)(1)) for an updated local mitigation plan. This section includes a description of the planning process used to update this plan, including how it was prepared, who was involved in the process, and how all of the involved agencies participated.

The Planning Team

Idaho County Disaster Management Coordinator, Jerry Zumalt, led the planning committee efforts. The Northwest Management, Inc. Project Manager was Brad Tucker. These individuals led a team of resource professionals that included county and city elected officials and staff, fire protection districts, law enforcement, hospital and public health districts.

The planning committee met with many residents of the County during the community risk assessments and at public meetings. Additionally, the press releases encouraged interested citizens to contact their county Emergency Management coordinator or attend planning committee meetings to ensure that all issues, potential solutions, and ongoing efforts were thoroughly discussed and considered by the committee. When the public meetings were held, many of the committee members were in attendance and shared their support and experiences with the planning process and their interpretations of the results.

The planning philosophy employed in this project included open and free sharing of information with interested parties. Information from federal and state agencies was integrated into the database of knowledge used in this project. Meetings with the committee were held throughout the planning process to facilitate a sharing of information between cooperators.

Description of the Planning Process

The Idaho County Multi - Hazard Mitigation Plan was developed through a collaborative process involving all of the organizations and agencies detailed in Chapter 1 of this document. The planning effort began by organizing and convening a countywide planning committee.

Idaho County utilized the LEPC committee to begin the update process. Once the meetings began in November of 2014, the committee identified other individuals/agencies that should be invited to participate. Jerry Zumalt with Idaho County Disaster Management invited representatives from the Forest Service and the Nez Perce Tribe to participate.

The planning process included seven distinct phases which were in some cases sequential (step 1 then step 2) and in some cases intermixed (step 5 completed throughout the process):

1. **Organization of Resources** – Idaho County and NMI worked together to develop a comprehensive list of potential participants as well as a project timeline and work plan. The 2014-15 planning committee served as the basis for identifying stakeholders; however, that list was expanded in order

to provide a comprehensive review and update of the risk assessments and mitigation strategies during the update process.

2. **Collection of Data –** NMI coordinated with the planning team to gather any new data and information about the extent and periodicity of hazards in Idaho County to ensure a robust dataset for making inferences about hazards.

3. **Field Observations and Estimations –** NMI and the planning team developed risk models and identified problem areas in order to better understand risks, juxtaposition of structures and infrastructure to risk areas, access, and potential mitigation projects. Many of the analyses used in the 2014-15 plan were reviewed and updated to incorporate new hazard vulnerabilities or changes in development. Additionally, several new risk models and analyses were included in the 2015 update process to better represent actual conditions in Idaho County.

4. **Mapping –** NMI developed a comprehensive database and map files relevant to pre-disaster mitigation control and mitigation, structures, resource values, infrastructure, risk assessments, and other related data. All of the maps and databases were updated as part of the 2015 plan update.

5. **Public Involvement –** NMI and Idaho County developed a plan to involve the public from the formation of the planning committee to news releases, public meetings, public review of draft documents, and acknowledgement of the final updated plan by the signatory representatives.

6. **Strategies and Prioritization** – NMI and the planning team representatives worked together to review the risk analyses and develop realistic mitigation strategies. As part of the 2015 plan update, a record of completed action items as well as a "2015 status" report of projects was included in the revised mitigation strategies for each jurisdiction.

7. **Drafting of the Report –** NMI drafted a final update report and worked with members of the planning team to review each section, incorporate public comments, proceed with the state and federal review processes, and adopt the final document.

Multi Jurisdictional Participation

CFR requirement §201.6(a)(4) calls for multi-jurisdictional planning in the development of Hazard Mitigation Plans that impact multiple jurisdictions. To be included as an adopting jurisdiction in the Idaho County Multi-Hazard Mitigation Plan jurisdictions were required to participate in at least one planning committee meeting or meet with planning team leadership individually, provide a goals statement, submit at least one mitigation strategy, and adopt the final Plan by resolution.

The following is a list of jurisdictions that have met the requirements for an adopting jurisdiction and are thereby included in the Multi - Hazard Mitigation Plan:

- Idaho County
- City of Cottonwood
- City of Ferdinand
- City of Grangeville
- City of Kamiah
- City of Kooskia
- City of Riggins
- City of Stites
- City of White Bird

All 9 jurisdictions also participated in the 2009 Idaho County Multi-Hazard Mitigation Plan. These jurisdictions were represented on the planning committee and at public meetings and participated in the development of hazard profiles, risk assessments, and mitigation measures.

The monthly planning committee meetings were the primary venue for authenticating the planning record. However, additional input was gathered from each jurisdiction in a combination of the following ways:

- Planning committee leadership attended local government meetings where planning updates were provided and information was exchanged. Additionally, representatives on the planning committee periodically attended city council meetings to provide municipality leadership with updates on the project and to request reviews of draft material. All of the adopting jurisdictions maintained active participation in the monthly planning committee meetings.
- One-on-one correspondence and discussions between the planning committee leadership and the representatives of the municipalities and special districts was facilitated as needed to ensure understanding of the process, collect data and other information, and develop specific mitigation strategies. NMI representatives emailed and/or called each jurisdiction individually at least once during the planning process to answer questions and request additional information.
- Public meetings were hosted by the communities of Riggins, Grangeville, and Kooskia. Each meeting involved elected officials, county and municipality representatives, local volunteers, and local citizenry were invited to attend.
- Written correspondence was provided at least monthly between the planning committee leadership and each participating jurisdictions updating the cooperators on the document's progress, making requests for information, and facilitating feedback. NMI representatives used an email distribution list of all the stakeholders to announce meetings, distribute meeting minutes, provide draft sections for review, and request information. All of the participating jurisdictions provided comments to the draft document during the data gathering phase as well as during the various committee and public review processes.
- At the request of planning committee leadership, several participating jurisdictions hosted copies of the draft Idaho County Multi-Hazard Mitigation Plan.

Planning Committee Meetings

Idaho County Disaster Management sent a formal invitation to prospective committee members inviting them to the initial project kickoff meeting. Additionally, an announcement regarding the kickoff meeting was made at the local LEPC meeting as well as other venues. Additional members were invited individually as they were identified by the committee.

The following list of people participated in at least one of the planning committee meetings and volunteered time or responded to elements of the Multi - Hazard Mitigation Plan's preparation. A few participants served on the committee as dual representatives of more than one jurisdiction. Many of the participants were also part of the original 2009 planning committee; however, the update process captured a wider variety of stakeholders than the original version of plan including the transportation department and health district representatives. A record of sign-in sheets is included in the Chapter 7 Appendices.

Idaho County Participants:

*Indicates Adopting Jurisdiction

Mark Anderson, Kooskia FD
Cocoa and Loren Anderson, Elk City VFD
Michael Edmondson, Public
Terry Cochran, Cottonwood Police Department
Terry Evans, Glenwood-Caribel Fire
Brian Crowl, North Idaho Correctional Institute
Charlotte Dasenbrock, St. Mary's EMT
Tara Hauntz, Western Governors University, Sundance Services, Alt. Nursing
Bill Spencer, Syringa Hospital & Ambulance
Russell Rojan, BPC Rural Fire District
Kevin Kehoe, Harpster Fire Protection District
David Rauzi, Idaho County Free Press
Mark Anderson, Kooskia FD
Dan Tackett, Grangeville Volunteer Fire Department
Bob Mager, City of Grangeville
Morgan Drew, Grangeville Police Department
Rick Thanstrom, Grangeville Police Department
Clyde F. Hanson, Camas Prairie Amateur Radio, Clearwater Lewis – Idaho Amateur Radio & Emergency Services
Jamie Edmondson, Public/Business Operator
David N. Poxleitner, Keuterville Highway District
Paul Goedert, Civil Air Patrol
Brad Tucker, Northwest Management
Meghan McEldery, Northwest Management
Tiana Luke, Northwest Management, Inc.
Jerry Zumalt, Idaho County Disaster Management
Trudy Slagle, Idaho County Sheriff's Office
Doug Giddings, Idaho County Sheriff's Office
Robert West, Lewis County Disaster Management
Casey Schooley, Public Health
Matthew Dudley, Public Health
Debbie Ruppe, Idaho Bureau of Homeland Security
Dave Summers, Idaho Department of Lands
Ken Stump, Idaho Department of Lands
Nick Carter, Idaho Department of Lands
Tim Tevebaugh, Idaho Department of Lands
Barry Ruklic, USFS NezPerce-Clearwater National Forest

Committee Meeting Minutes

Planning committee meetings were held from November 2014 through May 2015. The minutes and attendance records for each planning committee meeting are included in the Appendices.

Public Involvement

Public involvement in this plan was made a priority from the inception of the project. There were a number of ways that public involvement was sought and facilitated. In some cases, this led to members of the public providing information and seeking an active role in protecting their own homes and businesses, while in other cases it led to the public becoming more aware of the process without becoming directly involved in the planning.

News Releases

Under the auspices of the Idaho County Commissioners, periodic press releases were submitted to the (The Central Idaho Post, Idaho County Free Press, and The Clearwater Progress). The first press release informed the public that the Multi-Hazard Mitigation Plan process was taking place, who was involved, why it was important to Idaho County, and who to contact for more information. The second press release was in the form of a flyer announcing the public meeting dates and venues, which was distributed to local businesses by committee members. The third press release provided information regarding the public comment period including where hardcopies of the draft could be viewed, the availability of the draft on the (name website), and instructions on how to submit comments. A record of published articles regarding the Multi-Hazard Mitigation Plan is included in the Appendices.

Figure 2.1. Press Release #1 – Planning Process Announcement.

Idaho County

Media Release

From: **Jerry Zumalt, Idaho County Disaster Services**
Date: **November 3, 2014**
RE: **Idaho County Multi-Hazard Mitigation Plan Update**

Idaho County Set to Update Hazard Risk Plans

Grangeville, Id. Idaho County has launched a project to update the Idaho County Multi-Hazard Mitigation Plan. This update will include an update of the Idaho County Community Wildfire Protection Plan as well. Local agencies and organizations in Idaho County have created a committee to complete the required 5-year updates of these documents as part of the FEMA Pre-Disaster Mitigation program and National Fire Plan and Healthy Forests Restoration Act. The project is being funded through a grant from FEMA.

The planning update will include risk analyses, vulnerability assessments, and mitigation recommendations for the hazards of flood, landslide, earthquake, severe weather, wildland fire, terrorism/civil unrest, and others.

Northwest Management, Inc. has been retained by Idaho County to provide risk assessments, hazard mapping, field inspections, interviews, and to collaborate with the planning committee to update the Plans. The committee includes representatives from local communities, rural and wildland fire districts, Idaho Department of Lands, U.S Forest Service, Bureau of Land Management, highway districts, private landowners, area businesses, various Idaho County departments, and others.

One of the goals of the planning process will be to increase the participating jurisdictions' eligibility for additional grants that will help minimize the risk and potential impact of disaster events. The planning team will be conducting public meetings to discuss preliminary findings and to seek public input on the Plans' recommendations. A notice of the dates and locations of these meetings will be posted in local newspapers. Once completed, the updated draft Plans will also be available for public review and comment.

The first meeting is scheduled for November 20th at 9:00 am, located at the Soltman Center (directly across Main Street from the entrance to the Syringa Hospital) in Grangeville. For more information on the Idaho County Multi - Hazard Mitigation Plan update, or if you would like to attend the meeting, contact Jerry Zumalt, Idaho County Disaster Services, at 208-983-3074 or jzumalt@idahocounty.org.

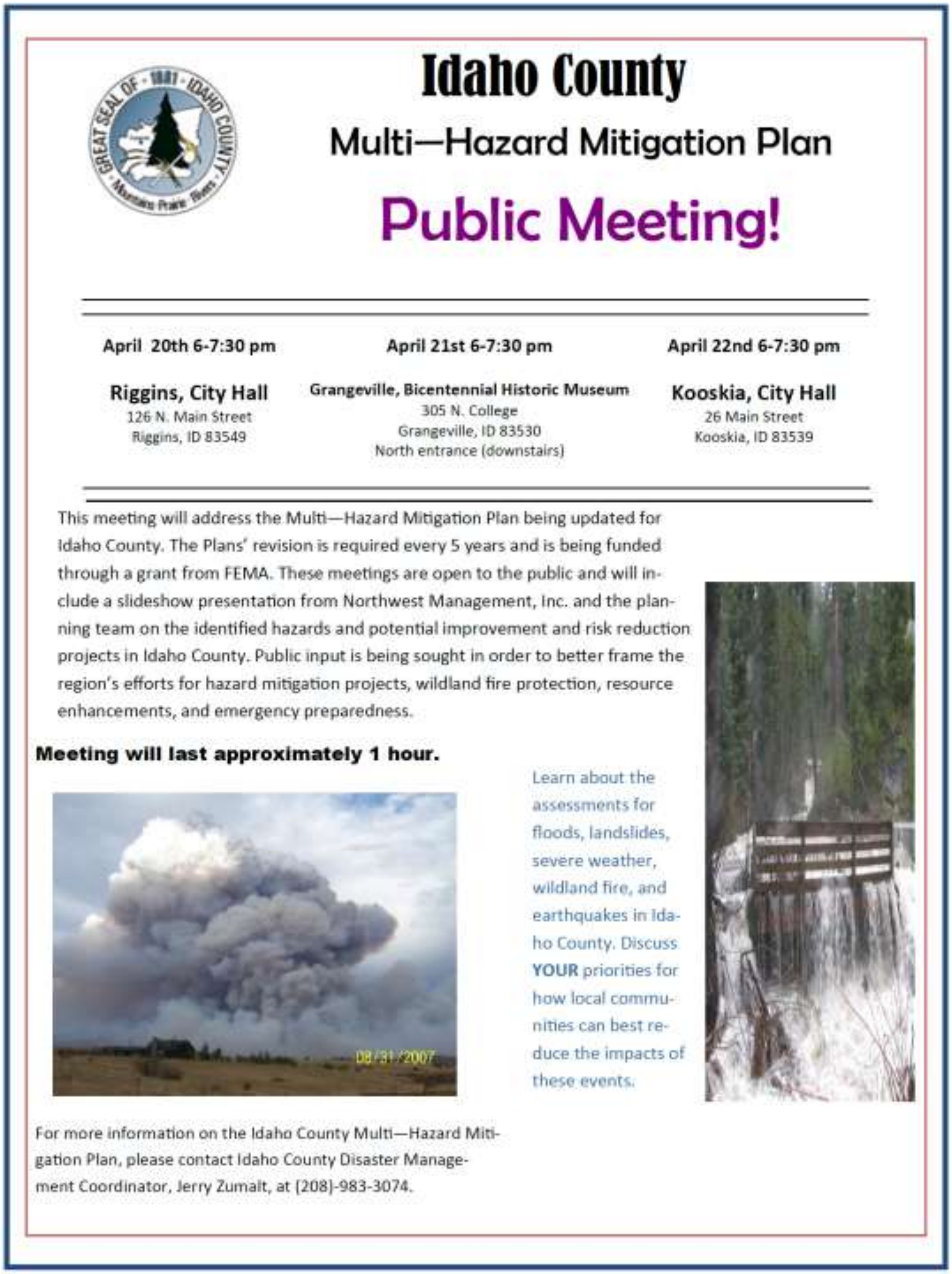
Public Meetings

Public meetings were scheduled in a variety of communities during the hazard assessment phase of the planning process. Venues for meetings were chosen by the planning team and located in each geographical area in order to provide an adequate opportunity for members of every community to attend without considerable travel. Public meetings focused on sharing information regarding the planning process, presenting details of the hazard assessments, and discussing potential mitigation treatments. Attendees at the public meetings were asked to give their impressions of the accuracy of the information generated and provide their opinions of potential treatments.

Public meetings were held in April. These meetings were attended by a number of individuals on the committee and 3 from the general public. A record of attendance at public meetings is included in the Appendices. The slideshow presentation used during the public meetings is also included in the Appendices.

The public meeting announcement was distributed throughout each community by committee members in the form of a flyer. A sample of the flyer is included below in Figure 2.2.

Figure 2.2. Press Release #2 - Public Meeting Flyer.



Idaho County

Multi—Hazard Mitigation Plan

Public Meeting!

April 20th 6-7:30 pm	April 21st 6-7:30 pm	April 22nd 6-7:30 pm
Riggins, City Hall 126 N. Main Street Riggins, ID 83549	**Grangeville, Bicentennial Historic Museum** 305 N. College Grangeville, ID 83530 North entrance (downstairs)	**Kooskia, City Hall** 26 Main Street Kooskia, ID 83539

This meeting will address the Multi—Hazard Mitigation Plan being updated for Idaho County. The Plans' revision is required every 5 years and is being funded through a grant from FEMA. These meetings are open to the public and will include a slideshow presentation from Northwest Management, Inc. and the planning team on the identified hazards and potential improvement and risk reduction projects in Idaho County. Public input is being sought in order to better frame the region's efforts for hazard mitigation projects, wildland fire protection, resource enhancements, and emergency preparedness.

Meeting will last approximately 1 hour.

Learn about the assessments for floods, landslides, severe weather, wildland fire, and earthquakes in Idaho County. Discuss **YOUR** priorities for how local communities can best reduce the impacts of these events.

For more information on the Idaho County Multi—Hazard Mitigation Plan, please contact Idaho County Disaster Management Coordinator, Jerry Zumalt, at (208)-983-3074.

Public Comment Period

A public comment period was conducted from (month and day) to (month and day), 2015 to allow members of the general public an opportunity to view the full draft plan and submit comments and any other input to the committee for consideration. A press release was submitted to the local media outlets announcing the comment period, the location of plans for review, and instructions on how to submit comments. Hardcopy drafts were printed and made available at the (list locations). Each hardcopy was accompanied by a letter of instruction for submitting comments to the planning committee. The draft plan was also posted for public review on the (name website). A record of published articles regarding the public comment period is included in the Chapter 7 Appendices.

Figure 2.3. Press Release #3 – Public Comment Period.

Idaho County

Media Release

From: Jerry Zumalt, Idaho County Disaster Services
Date: ?, 2015
RE: Idaho County Multi-Hazard Mitigation Plan Update

Idaho County Hazard Plans Available for Public Review

The Idaho County Multi-Hazard Mitigation Plan update, has been completed in draft form and is available to the public for review and comment at the locations listed below. Electronic copies may be viewed in pdf format at http://www.consulting-foresters.com/?id=clients. The public review phase of the planning process will be open from ?, 2015 thru ?, 2015.

The purpose of the Idaho County Multi-Hazard Mitigation Plan (MHMP) is to reduce the impact of hazards such as floods, landslides, severe weather, wildfire, extended power outage, crop loss, and terrorism/civil unrest on Idaho County residents, landowners, businesses, communities, local governments, and state and federal agencies while maintaining appropriate emergency response capabilities and sustainable natural resource management policies. The MHMP identifies high risk areas as well as structures and infrastructure that may have an increased potential for loss due to a hazard event. The documents also recommend specific projects that may help prevent disasters from occurring altogether or, at the least, lessen their impact on residents and property. The MHMP is being developed by a committee of city and county elected officials and departments, local and state emergency response representatives, land managers, highway district representatives, and others.

The Idaho County MHMP includes risk analysis at the community level with predictive models for where disasters are likely to occur. These Plans will enable Idaho County and its communities to be eligible for grant dollars to implement the projects and mitigation actions identified by the committee. Although not regulatory, the MHMP will provide valuable information as we plan for the future.

Comments on the MHMP must be submitted to the attention of Brad Tucker, Northwest Management Inc., at tucker@nmi2.com or mailed to PO Box 9748, Moscow, ID 83843 by close of business on ?, 2015. For more information on the Idaho County MHMP update process, contact Jerry Zumalt at 208-983-3074 or jzumalt@idahocounty.org.

Continued Public Involvement

Idaho County is dedicated to involving the public directly in review and updates of this Multi - Hazard Mitigation Plan. The County Disaster Management Coordinator, through the planning committee, is responsible for the annual review and update of the Plan as recommended in the "Plan Monitoring and Maintenance" section below.

The public will have the opportunity to provide feedback about the Plan annually on the anniversary of the adoption at a meeting of the County Board of Commissioners. Copies of the Plan will be kept at the Idaho

County Disaster Management office in the basement of the Idaho County Courthouse. The Plan also includes contact information for the Disaster Management Coordinator, who is responsible for keeping track of public comments.

A public meeting will also be held as part of each annual evaluation or when deemed necessary by the planning committee. The meetings will provide the public a forum for which they can express concerns, opinions, or ideas about the Plan. The County Commissioner's Office will be responsible for using County resources to publicize the annual meetings and maintain public involvement through the County's webpage and local newspapers.

Documented Review Process

Review and comment on this Plan has been provided through a number of avenues for the committee members as well as for members of the general public. A record of the document's review process has been established through email correspondence, press releases, published articles, meeting minutes, and meeting sign-in sheets. Proof of these activities is recorded in the Chapter 7 Appendices.

During regularly scheduled committee meetings in 2014-15, the committee members met to discuss findings, review mapping and analysis, and provide written comments on draft sections of the document. During the public meetings attendees observed map analyses, photographic collections, discussed general findings from the community assessments, and made recommendations on potential project areas.

Sections of the draft Plan were delivered to the planning committee members during the regularly scheduled committee meetings. The completed first draft of the document was presented to the committee during the month of July for full committee review. The committee spent a couple of weeks proofreading and editing sections of the draft. Many jurisdictions met individually to review and revise their specific risk assessment and mitigation strategy including the prioritization of action items. Once the committee's review was completed, the draft document was released for public review and comment. The public review period remained open from (month and day) thru (month and day), 2015.

Plan Monitoring and Maintenance

As part of the policy of Idaho County in relation to this planning document, this entire Multi - Hazard Mitigation Plan should be reviewed annually (from date of adoption) at a special meeting of a joint planning committee, open to the public and involving all jurisdictions, where action items, priorities, budgets, and modifications can be made or confirmed. Idaho County Disaster Management (or an official designee of the joint committee) is responsible for the scheduling, publicizing, and leadership of the annual review meeting. During this meeting, participating jurisdictions will report on their respective projects and identify needed changes and updates to the existing Plan. Maintenance to the Plan should be detailed at this meeting, documented, and attached to the formal plan as an amendment to the Multi - Hazard Mitigation Plan. Re-evaluation of this plan should be made on the 5th anniversary of its acceptance, and every 5-year period following.

Annual Review Agenda

The focus of the joint planning committee at the annual review meeting should include at least the following topics:

- Update historical events record based on any events in the past year.
- Review county profile and individual community assessments for each hazard and note any major changes or mitigation projects that have altered the vulnerability of each entity.
- Add a section to note accomplishments or current mitigation projects.
- All action items in Chapter 6 will need updated as projects are completed and as new needs or issues are identified.
- Address Emergency Operations Plans – how can we dovetail the two plans to make them work for each other? Specifically, how do we incorporate the County's EOP into the action items for the regional MHMP?
- Incorporate additional hazard chapters as funding allows.

All meeting minutes, press releases, and other documentation of revisions should be kept on record by Idaho County Disaster Management.

Five Year Re-evaluation Agenda

The focus of the planning committee at the five year re-evaluation should include all of the topics suggested for the annual review in addition to the following items:

- Update County demographic and socioeconomic data.
- Address any new planning documents, ordinances, codes, etc. that have been developed by the County or cities.
- Review listed communication sites.
- Review municipal water sources, particularly those in the floodplain or landslide impact areas.
- Redo all risk analysis models incorporating new information such as an updated County parcel master database, new construction projects, development trends, population vulnerabilities, changing risk potential, etc.
- Update county risk profiles and individual community assessments based on new information reflected in the updated models.

All meeting minutes, press releases, and other documentation of revisions should be kept on record by Idaho County Disaster Management.

Chapter 3

Community Profile

IN THIS SECTION:

- Description of the Region
- Geography and Climate
- Population and Demographics
- Natural Resources
- Hazard Management Capabilities
- Regional Hazard Profile

This Page Intentionally Left Blank

Chapter 3 – Community Profile

Idaho County Characteristics

The following section has been summarized from information available at Idaho County's website[7]which was information borrowed from: Idaho County Voices, From The Pioneers To The Present, Pioneer Days in Idaho County Volume 1 by Alfreda Elsensohn.

Idaho County is the largest County in Idaho by geographic area. It covers 8,503 square miles, and has 6,925 square miles of National Forest land within the county.

The area now comprising Idaho County was part of Oregon Territory from 1848 to 1859. With Oregon statehood, it became a part of Washington Territory, and, in 1863, of Idaho Territory. A law in 1875 forced some changes in regards to Idaho County boundaries. Therefore in amendment of that law, new boundaries were defined to as they are to this day.

The first settlement in the new county was by gold seekers from Pierce, Idaho, who in 1861 followed the Nez Perce Trail into Elk City Basin, hopeful of finding gravel deposits that would contain gold. The hopes of miners were realized and Elk City became the pioneer settlement of the upper Clearwater County. No town existed until the following year when a local government was established.

The gold seekers trek had begun. News of discoveries in Florence reached the ears of prospectors everywhere. Thousands of men left good gravel deposits for the better promise of gold in the Idaho mountain area of Florence. By the fall of 1862 a town of tents, lean-tos and brush houses had developed into a boom town. Florence became the first county seat town.

By 1875 Mount Idaho was developing into a prosperous town. Built largely as a stop for traffic to the gold fields, it seemed destined to be a more permanent settlement than the boom towns. It won a special election in 1875 for county seat. Mining was spreading to other areas: Orogrande, Dixie, Newsome, Salmon River, Golden, Marshall Lake, Burgdorf and others. Seventeen mining districts existed at that time, according to the Bicentennial Edition of the Idaho County Free Press published in 1976.

Mining activities had slowed down before World War II and the war saw the close of the remaining operations. In years since, several have tried to reopen, but most of today's mining is done with the use of small suction-type dredges that one sees operating along streams.

While the early mining towns were drawing in gold seekers, a new kind of traffic was developing. The Pre-Emption Act of 1841 allowed any American not already owning land to buy 160 acres in the public domain and pay later $ 1.25 per acre. The Homestead act of 1862 supplemented the Pre-emption Act by offering a settler 160 acres of public land for a nominal fee after five years of residence. Stages and wagons lumbered across the Prairie with passengers including families looking to settle on this land, and with entrepreneurs who knew that hotels, livery barns, saloons, blacksmith shops, stores, real estate firms and other businesses would be needed and would provide a profitable living.

---

[7] Idaho County, Idaho. Available at http://idahocounty.org/idaho-county-history/. Accessed November, 2014.

While land was available in some areas, land on the Nez Perce Reservation was not open to the settlers until the government concluded a treaty with the Nez Perce Tribe ceding a part of their land to the Federal Government. The opening up of the land gave rise to the growth of agriculture. Many who had come into the State to search for gold remained to take up land, finding their gold in the rich soil and favorable climatic conditions. By 1864 ranches were scattered over the Prairie and along the rivers.

In 1905 at Portland and again in 1909 at Seattle the Idaho County exhibit of grains and grasses won the Gold Medal in competition with several other states. Stock raising began almost simultaneously with the tilling of the soil. Mountains, valleys, river breaks and high plateaus afforded fine grazing land. Cattle, horses, sheep and swine were raised. To breed better horses the pioneers shipped sires from the East.

Idaho County did not escape the wars on ranges between the sheep men and the cattlemen in the early 1900's. The Forest Service stepped in to help control the range. The first passenger train whistled into Grangeville on the Camas Prairie Railroad in 1908 and the present State Cattle Association was organized in the 1920's. Idaho County organized its Association in 1958. Hereford and Aberdeen-Angus eventually became the main breeds of beef cattle.

Following the War, the growth of Grangeville brought another change in county seat. An election gave it to the fast growing town where it has remained 87 years. By 1937 a North-South highway from Bonners Ferry to Boise was completed and all except two small stretches were oiled.

The timber industry developed as an economic asset to the County. In the 1940's this industry began to develop on a full scale. While sawmills, mostly privately owned, were built earlier to produce lumber chiefly for home building, it was the huge demand for timber after World War II that made timber production a leading industry. "Potlatch Forest Inc. began cutting on the first major site on the Forest in 1944 in the Meadow Creek-Cougar Creek area. Within two years 75 million board feet had been taken out of the area.

While mining as an economic asset to the county was short lived, it gave the county its economic beginning and contributed sporadically to the economy throughout its developing years. Forestry and the timber industry, farming and ranching remain the lifeblood of the county, invigorated in recent years by the growth of tourism as a lucrative industry.

Description of the Region

Idaho County is located in Central, Idaho with the Snake River running along the western boundary. The Salmon River, Lochsa River, Clearwater River, Selway River, and their respective tributaries, drain Idaho County's heartland and empty into the Snake River. Elevations range from less than 1,000 feet above sea level at the confluence of the Snake and Salmon Rivers to 9,400 feet in the Seven Devils Wilderness at the western side of the County. Much of the county is covered by mountains and canyons with elevational changes of 1,ooos of feet, making Idaho County one of the most inaccessible and remote counties in the state. Ownership is mixed between federal (mainly US Forest Service), state and private owners.

Table 3.1. Land Ownership Categories in Idaho County		
Entity	**Acres**	**Percent of Total Area**
US Forest Service	4,434,502.1	81.5%
Private	791,650.3	14.6%
Bureau of Land Management	91,913.7	1.7%
State	74,044.1	1.4%
Other (including BIA land)	26,336.0	0.5%
Water	13,054.6	0.2%
Indian Reservation	4,183.5	<1%
State Fish & Game	1,497.1	<1%
State Parks & Recreation	159.3	<1%
U.S. Fish & Wildlife Service	126.7	<1%
National Park Service	84.2	<1%
Total	**5,437,551.7**	**100%**

Geography and Climate

The topography of Idaho County is extremely varied, from low elevation of the Clearwater, Snake and Salmon River canyons to high, steep mountainous terrain of the Seven Devils Wilderness, Gospel Hump Wilderness, Selway-Bitterroot Wilderness, and the Frank Church River of No Return.

High-glaciated mountains throughout Idaho County are dotted with dozens of glacial lakes. The terrain is very steep, rocky, and rugged, and much is granite rock covered with alpine vegetation. The south central area is relatively gentle and rolling with the Weiser River and its tributaries ultimately flowing south out of the county.

Idaho County is relatively free of any significant mountain barriers to impede the normal movement of the moisture laden air masses from the Pacific Ocean. Most of the total annual precipitation is attributed to storms rotating around a center of low atmospheric pressure traveling on an easterly course. Average annual precipitation received by Idaho County ranges from 19.21 inches in Cottonwood to 25.8 inches at Elk City, with Grangeville and Kooskia receiving from 21 to 23 inches. The greatest amount of precipitation is received between January and February, normally in the form of snow, and very little precipitation occurs during the summer months. The average annual snowfall can range from 21.1 inches at Kooskia to 42.6 inches at Cottonwood and as much as 128 inches at Lolo Pass in the northeastern corner of the County. The mean annual temperature varies from 51.4 degrees Fahrenheit at Elk City to 50.9 degrees Fahrenheit at Kooskia. The lowest temperature occurs between January and February, with Elk City reporting a maximum low of -43 degrees Fahrenheit in February 1996. The highest temperatures annually occur in July and August, and Kooskia reported a high of 116 degrees Fahrenheit in July 1934.

Demographics and Socioeconomics

The 2010 Census established the Idaho County population at 16,267, which is up from 15,511 in 2000. The population of Grangeville in 2010 was 3,141 and the population of Kamiah was 1,295. Table 3.1 shows historical changes in population among the various communities within Idaho County.

Table 3.2. Historical and Current Population by Community.					
	1970	1980	1990	2000	2010
Idaho County	12,891	14,769	13,783	15,511	16,267
Cottonwood	867	941	882	944	900
Ferdinand	157	144	135	145	159
Grangeville	3,636	3,666	3,226	3,228	3,141
Kamiah	1,307	1,478	1,157	1,160	1,295
Kooskia	809	784	692	675	607
Riggins	533	527	443	410	419
Stites	263	253	204	226	221
White Bird	185	154	108	106	91

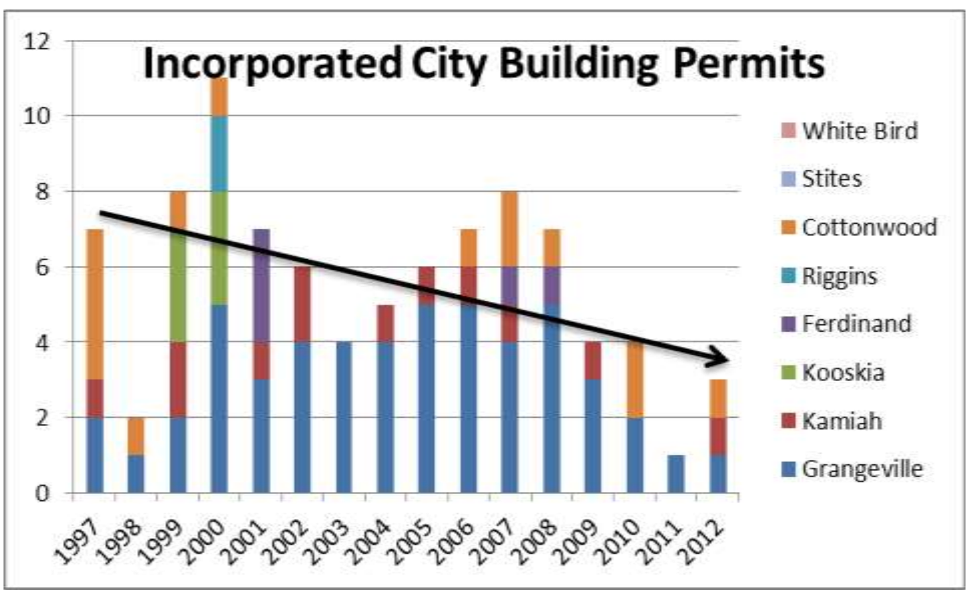
The 2010 Census reported that ethnicity in Idaho County is comprised of 93.8% white, 2.6% Hispanic or Latino, 3.0% American Indian, 0.4% Asian, and 0.3% African American. Approximately 52.2% of residents are male. There are 6,834 occupied housing units (78.2% of available housing units) in Idaho County.[8]

Development Trends

The chart below describes the development trend in Idaho County by showing the number of building permits applied for in each incorporated city within Idaho County. There is a downward trend over the fifteen year span analyzed.

The table above shows the population trends for both the incorporated and unincorporated parts of Idaho County. The population of Idaho County has increased nearly 5% since the 2000 census however; many of the incorporated cities have decreased in population. This suggests that more people are moving into the more rural and unincorporated parts of the County.

Figure 3.1. Annual Building Permits from 1997 to 2012.



[8] US Census Bureau. American FactFinder. Available online at http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF. Accessed December, 2014.

Natural Resources

Idaho County is a diverse ecosystem with a complex array of vegetation, wildlife, and fisheries that have developed with, and adapted to fire as a natural disturbance process. Nearly a century of wildland fire suppression coupled with past land-use practices (primarily timber harvesting, agriculture, and mining) has altered plant community succession and has resulted in dramatic shifts in the fire regimes and species composition. As a result, some forests in Idaho County have become more susceptible to large-scale, high-intensity fires posing a threat to life, property, and natural resources including wildlife and plant populations. High-intensity, stand-replacing fires have the potential to seriously damage soils, native vegetation, and fish and wildlife populations. In addition, an increase in the number of large, high-intensity fires throughout the nation's forest and rangelands has resulted in significant safety risks to firefighters and higher costs for fire suppression.

Fish and Wildlife – Idaho County is home to a diverse array of fish and wildlife species. Idaho County streams provide habitat for trout, salmon, sturgeon, bass, catfish, crappie, perch, and pike, including populations that are listed as threatened under the federal Endangered Species Act. Forestlands and interface areas are important habitat for many species of birds and mammals.

Vegetation - Vegetation in Idaho County is a mix of forestland and rangeland ecosystems. An evaluation of satellite imagery of the region provides some insight to the composition of the forest vegetation of the area. The full extent of the county was evaluated for cover type as determined from Landsat 7 ETM+ imagery in tabular format and is presented in Table 3.3.

The most represented vegetated cover type is conifer dominated forests at approximately 73% of the total area. The next most common vegetation cover type represented is perennial grass slopes at 10%. Shrublands are the third most common cover type at 5% closely followed by agriculture, exotics, and areas that are sparsely covered with vegetation (4%, 3%, and 3% respectively). None of the remaining ground cover types total in excess of 1% in any one category (Table 3.3).

Table 3.3. Vegetative Cover Types in Idaho County

Land Cover	Acres	Percent of Total Area
Conifer	3,948,497	73%
Grassland	536,046	10%
Shrubland	276,422	5%
Agriculture	198,950	4%
Exotic Herbaceous	166,132	3%
Sparsely Vegetated	151,616	3%
Riparian	80,675	1%
Developed	50,324	1%
Water	14,220	<1%
Hardwood	11,384	<1%
Barren	1,812	<1%
Snow-Ice	1,091	<1%
Conifer-Hardwood	382	<1%
Total	**5,437,552**	**100%**

Vegetative communities within the county follow the strong moisture and temperature gradient related to the major river drainages. Limited precipitation and steep slopes result in a relatively arid environment in the southern portion of the county, limiting vegetation to drought-tolerant plant communities of grass and shrub lands, with forests of mixed pine and fir occurring at the higher elevations in the north end of the county. As moisture availability increases, so does the abundance of conifer species, with subalpine forest communities present in the highest elevations where precipitation and elevation provide more available moisture during the growing season.

Hydrology

The Idaho Water Resource Board is charged with the development of the Idaho Comprehensive State Water Plan. Included in the State Water Plan are the statewide water policy plan, and component basin and water body plans which cover specific geographic areas of the state (IDEQ 2003). The Idaho Department of Water Resources has prepared General Lithologies of the Major Ground Water Flow Systems in Idaho. The majority of Idaho County has not been designated by the IWRB as a ground water system.

The state may assign or designate beneficial uses for particular Idaho water bodies to support. These beneficial uses are identified in sections 3.35 and 100.01 - .05 of the Idaho water quality standards (WQS). These uses include:

- **Aquatic Life Support:** cold water biota, seasonal cold water biota, and warm water biota;
- **Contact Recreation:** primary (swimming) and secondary (boating);
- **Water Supply:** domestic, agricultural, and industrial; and
- **Wildlife Habitat and Aesthetics**

While there may be competing beneficial uses in streams, federal law requires DEQ to protect the most sensitive of these beneficial uses (IDEQ 2003).

The geology and soils of this region lead to rapid to moderate moisture infiltration. Slopes are moderate to steep, however, headwater characteristics of this watershed lead to a high degree of infiltration as opposed to a propensity for overland flow. Thus sediment delivery efficiency of first and third order streams is fairly low. The bedrock is typically well fractured and moderately soft. This fracturing allows excessive soil moisture to rapidly infiltrate into the rock and thus surface runoff is rare. Natural mass stability hazards associated with slides are low. Natural sediment yields are low for these watersheds. However, disrupted vegetation patterns from logging (soil compaction) and wildland fire (especially hot fires that increase soil hydrophobic characteristics), can lead to increased surface runoff and debris flow to stream channels.

A significant component of Idaho County's infrastructure is the water sources that are maintained for use by communities. While the Idaho Water Resources Board does not monitor all drinking water supplies in the State, they are charged with maintaining standards on municipal drinking water supplies. These include community water sources, water used in a business, and similar drinking water supplies in the County. Three categories of municipal water are recognized: Groundwater, spring-groundwater, and surface water. The former two are generally considered resistant to surface disturbances such as fire, flood, landslide, and severe weather events. The latter is considered much more influenced by many hazards. Earthquakes can impact all collection types, while landslides that directly contact any of them will have an impact.

Air Quality

The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides.[9]

The Clean Air Act, passed in 1963 and amended in 1977, is the primary legal authority governing air resource management. The Clean Air Act provides the principal framework for national, state, and local efforts to protect air quality. Under the Clean Air Act, the Organization for Air Quality Protection Standards (OAQPS) is responsible for setting the NAAQS standards for pollutants which are considered harmful to people and the environment. OAQPS is also responsible for ensuring these air quality standards are met, or attained (in cooperation with state, Tribal, and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories, and other sources.[10]

Smoke emissions from fires potentially affect an area and the airsheds that surround it. Climatic conditions affecting air quality in Idaho are governed by a combination of factors. Large-scale influences include latitude, altitude, prevailing hemispheric wind patterns, and mountain barriers. At a smaller scale, topography and vegetation cover also affect air movement patterns. Locally adverse conditions can result from occasional wildland fires in the summer and fall, and prescribed fire and agricultural burning in the spring and fall.

Due principally to local wind patterns, air quality in Idaho County is generally good to excellent, rarely falling below IDEQ pollution standards. However, locally adverse conditions can result from occasional wildland fires in the summer and fall, and prescribed fire and agricultural burning in the spring and fall. All major river drainages are subject to temperature inversions, which trap smoke and affect dispersion, causing local air quality problems. This occurs most often during the summer and fall months and would potentially affect all communities in Idaho County.

Smoke management in Idaho County is facilitated, in part, by the Idaho/Montana Airshed Group. This group advises when conditions are appropriate for prescribed burning based on information participating members (burners) supply to them. There is a slim portion of Airshed Unit 12B in the northern end of the county, Airshed Units 14, 15 and 16 make up the extreme southern portion of the county. The remainder of the county is in Airshed Unit 13. The Missoula impact zone is just to the northeast of Idaho County. Class I areas in/near Idaho County include Hells Canyon, Eagle Cap, and Selway/Bitterroot areas. An airshed is a geographical area which is characterized by similar topography and weather patterns (or in which atmospheric characteristics are similar, e.g., mixing height and transport winds). The USDA Forest Service, Bureau of Land Management, and the Idaho Department of Lands are all members of the Montana/Idaho State Airshed Group, which is responsible for coordinating burning activities to minimize or prevent impacts from smoke emissions. Prescribed burning must be coordinated through the Missoula Monitoring Unit, which coordinates burn information, provides smoke forecasting, and establishes air quality restrictions for the Montana/Idaho Airshed Group. The Monitoring Unit issues daily decisions that may restrict burning when

[9] USDA-Forest Service (United States Department of Agriculture, Forest Service). 2000. Incorporating Air Quality Effects of Wildland Fire Management into Forest Plan Revisions – A Desk Guide. April 2000. – Draft.

[10] Louks, B. 2001. Air Quality PM 10 Air Quality Monitoring Point Source Emissions; Point site locations of DEQ/EPA Air monitoring locations with Monitoring type and Pollutant. Idaho Department of Environmental Quality. Feb. 2001. As GIS Data set. Boise, Idaho.

atmospheric conditions are not conducive to good smoke dispersion. Burning restrictions are issued for airsheds, impact zones, and specific projects. The monitoring unit is active from March through November. Each Airshed Group member is also responsible for smoke management all year.[11]

Additionally, the Federal Air Rules for Indian Reservations (FARR) in Idaho, Oregon, and Washington is a set of air quality regulations established under the Clean Air Act. The FARR creates rules to manage activities that cause air pollution.

The FARR applies to all residents (both tribal members and non-tribal members) and businesses located within the exterior boundaries of reservations in Idaho, Oregon, and Washington. The ownership status of land on the reservation does not affect how the rules apply.

The Rule for Forestry and Silvicultural Burning Permits sets up a permit program for forestry and silvicultural burning on the Nez Perce Indian Reservation. People on the reservation who want to perform forestry and silvicultural burning will need to get a permit. Forestry and silvicultural burning is the burning of vegetation that comes from the growing and harvesting of trees and timber. This type of burning includes slash burning, burning for reducing fire hazards, and burning for managing the forest environment. Burning may also be performed to prevent disease, to control pests, and for forest reproduction.

Hazard Management Capabilities

Idaho County Disaster Management is responsible for the administration and overall coordination of the disaster management program for Idaho County and the cities within the county. The Incident Command System (ICS) is the basis for all direction, control and coordination of emergency response and recovery efforts. Emergency response and supporting agencies and organizations have agreed to carry out their objectives in support of the incident command structure to the fullest extent possible.

The Idaho County Government Office houses a staff of emergency management personnel trained and dedicated to mitigating the negative impacts of natural and man-made disasters in the County. City offices throughout the county are equally dedicated to reducing catastrophic losses from disasters although their budgets are extremely limited.

Many states, counties and communities in the nation believe they are prepared for natural and man-made disasters; however, not all of them have faced the necessity of testing this belief. Too often, resources are tested beyond the ability of counties and communities to effectively respond, especially when the unexpected occurs. The Idaho Bureau of Homeland Security (IBHS) and FEMA work closely with the counties and communities of Idaho in the form of desktop exercises and preparedness drills in order to increase preparations and abilities of the state's first responders.

Idaho County, Cottonwood, Ferdinand, Grangeville, Kamiah, Kooskia, Riggins, Stites, and White Bird participate in preparedness drills, public education efforts, the implementation and enforcement of planning and zoning policies.

[11] Montana/Idaho Airshed Management Group. 2010. Montana/Idaho Airshed Management System. Available online at http://www.smokemu.org/.

The Payette and Nez Perce-Clearwater National Forests have Cooperative Law Enforcement agreement that allows the Forest Service to pay the County Sheriff's Department for services and equipment used on the Forest. Idaho Department of Lands also has memorandums of understanding with all of the rural fire departments within Idaho County that allows the Forest Service or the fire departments to render mutual aid on fires outside of their respective jurisdiction.

Regional Hazard Profile

SHELDUS is a county-level hazard data set for the U.S. for 18 different natural hazard event types such as thunderstorms, hurricanes, floods, wildfires, and tornados. For each event, the database includes the beginning date, location (county and state), property losses, crop losses, injuries, and fatalities that affected Idaho County.

The data were derived from several existing national data sources such as National Climatic Data Center's monthly Storm Data publications and NGDC's Tsunami Event Database. With the release of SHELDUS 7.0, the database includes loss causing and/or deadly event between 1960 through 1975 and from 1995 onward. Between 1976 and 1995, SHELDUS reflects only events that caused at least one fatality or more than $50,000 in property or crop damages.

Prior to 2001, property and crop losses occurring on the same day within the same geography (i.e. county) are aggregated by hazard type. For events that covered multiple counties, the dollar losses, deaths, and injuries were equally divided among the counties (e.g. if 4 counties were affected, then each was given 1/4 of the dollar loss, injuries and deaths). Where dollar loss estimates were provided in ranges (e.g. $50,000 - 100,000) - such as in NCDC Storm data until 1995 - the lowest value in the range of the category was used. This results in the most conservative estimate of losses during the time period of 1960-1995. Since 1995 all events that were reported by the National Climatic Data Center (NCDC) with a specific dollar amount are included in the database.[12]

It is important to keep in mind that the SHELDUS database does not include every hazard event that occurred within an area. Only those events that met a specific reporting criterion as explained above are listed. This means that many local events are not included in this database. Some of the missing events are considered to be major local hazard events such as the 1996-97 and 2010 flooding events that had caused major short and long-term damages within the county.

Since 1960, there have been 11 hazard related injuries primarily due to severe weather events. During this time period there has been 1 fatality. These incidents are also primarily due to severe weather events. Traffic accidents are likely the most common cause of injuries and fatalities from hazard-related events. The following figure shows the economic losses from hazard events occurring from 1960 - 2009.[13]

[12] HVRI. Natural Hazards Losses 1960-2008 (SHELDUS). Hazards &Vulnerability Research Institute. University of South Carolina. Columbia, South Carolina. Available online at http://webra.cas.sc.edu/hvri/. February 2010.

[13] Hazards & Vulnerability Research Institute (2011). The Spatial Hazard Events and Losses Database for the United States, Version 9.0 [Online Database]. Columbia, SC: University of South Carolina. Available from http://www.sheldus.org

Figure 3.2. Economic Losses from Hazard Events

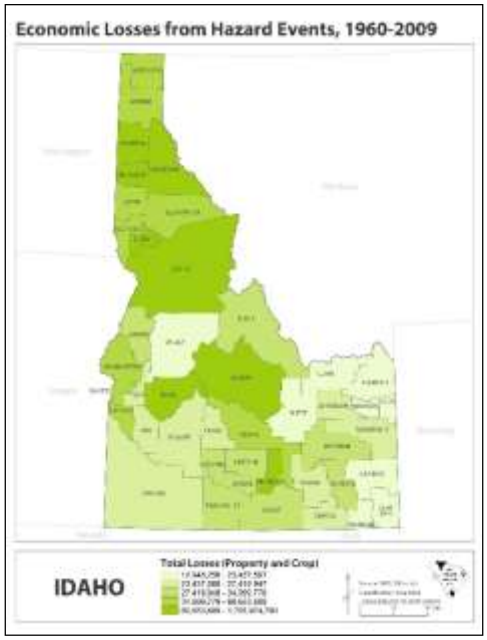


Figure 3.3. Summary of Property Damages in the SHELDUS Hazard Profile.[10]

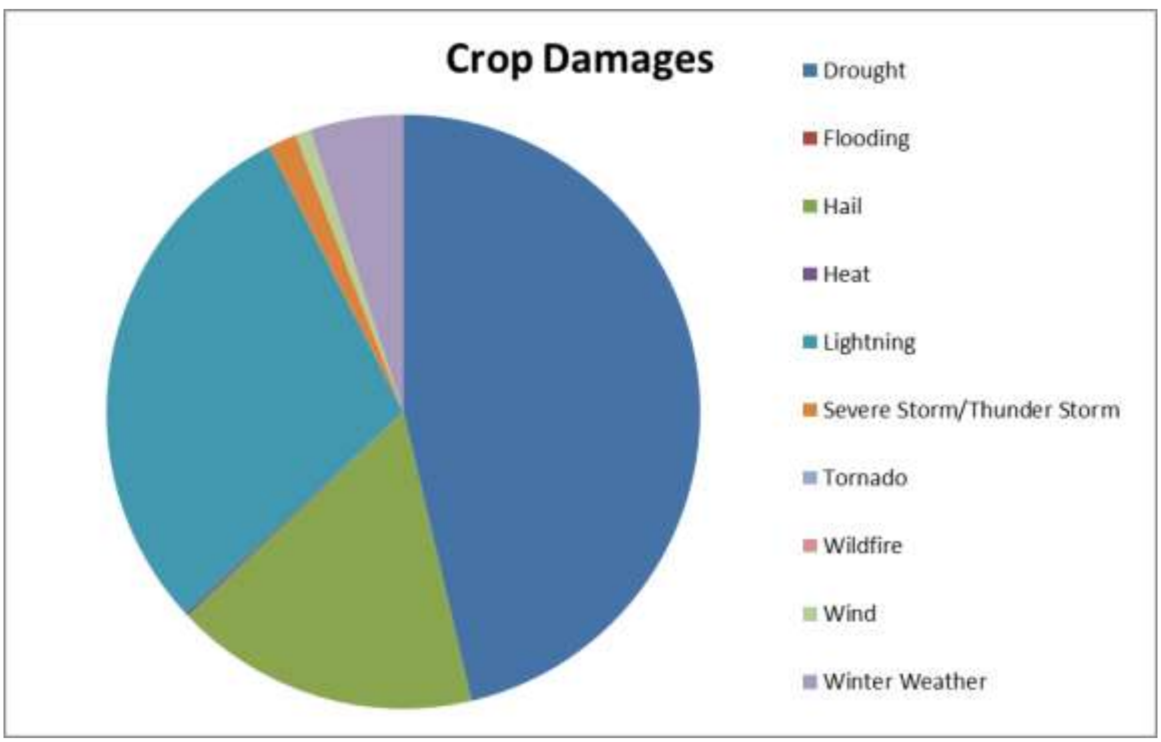
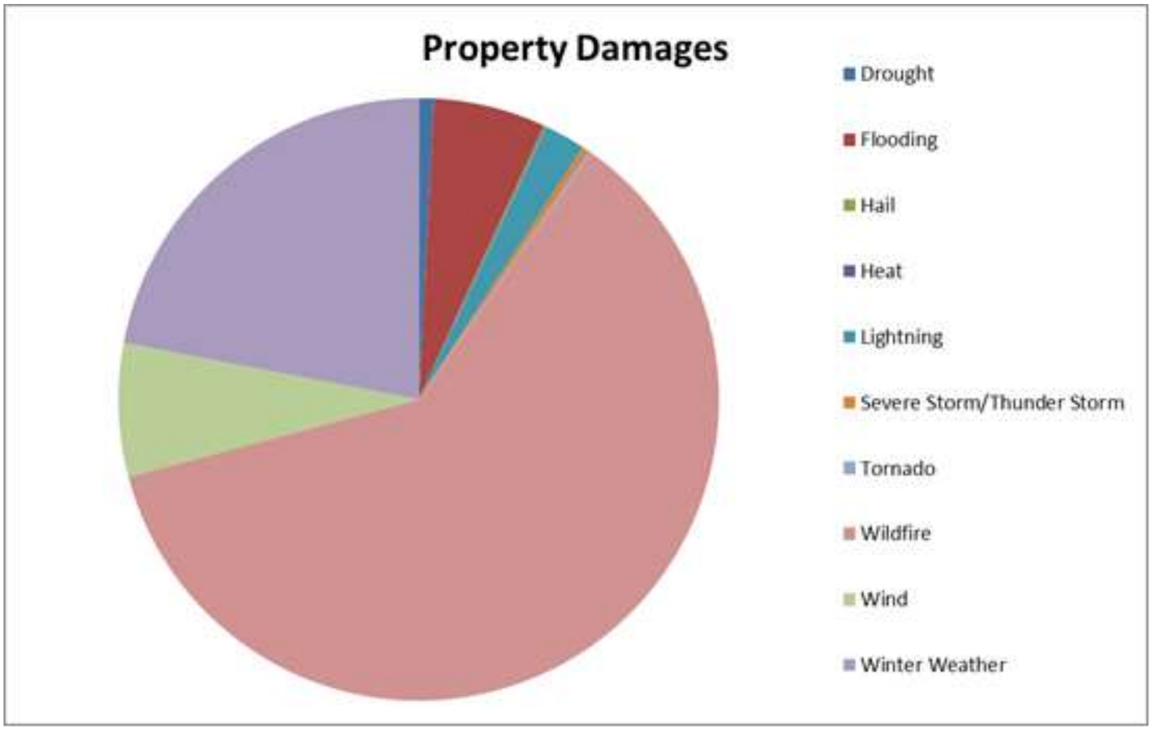


Figure 3.4. Summary of Crop Damages in the SHELDUS Hazard Profile.[10]



Chapter 4

Flood Hazard Profile

IN THIS SECTION:

- Regional and Local Hazard Profile
- Jurisdictional Risk and Vulnerability Assessment
- Individual Community Assessments

This Page Intentionally Left Blank

Chapter 4 – Flood

Regional and Local Hazard Profile

Floods have been a serious and costly natural hazard affecting Idaho County and are the primary natural disaster in the State of Idaho. Floods damage roads, farmlands, and structures, often disrupting lives and businesses. Simply put, flooding occurs when water leaves the river channels, lakes, ponds, and other confinements where we expect it to stay. Flood-related disasters occur when human property and lives are impacted by flood waters. An understanding of the role of weather, runoff, landscape, and human development in the floodplain is therefore the key to understanding and controlling flood-related disasters. Major disaster declarations related to flooding were made for Idaho in 1956, 1957, 1961, 1962, 1963, 1964, 1972, 1974, 1984, 1996, 1997, 2005, 2006, 2008, 2010, and 2011.

Floods can be divided into two major categories in central Idaho: riverine and flash flood. Riverine flooding is associated with a river‘s watershed, which is the natural drainage basin that conveys water runoff from rain and snowmelt. Riverine flooding occurs when the flow of runoff is greater than the carrying capacities of the natural drainage systems. Rain water and snowmelt runoff that is not absorbed by soil or vegetation seeks surface drainage lines following natural topography lines. These lines merge to form a hierarchical system of rills, creeks, streams, and rivers. Generally, floods can be slow or fast rising depending on the size of the river or stream.

Flash floods are much more dangerous and flow much faster than riverine floods. Flash floods are caused by the introduction of a large amount of water into a limited area (e.g. extreme precipitation events in watersheds less than 50 square miles). They also tend to crest quickly (e.g. eight hours or less) and more commonly occur in hilly or otherwise confined terrain. Flash floods occur in both urban and rural settings, principally along smaller rivers and drainage ways that do not typically carry large amounts of water. This type of flood poses more significant safety risks than riverine floods because of the rapid onset, the high water velocity, the potential for channel scour, and the debris load.[14]

There are three types of flash flooding:

- Extreme precipitation and runoff events
- Inadequate urban drainage systems overwhelmed by small intense rainstorms
- Dam failures

Events that may lead to flash flooding include significant rainfall and/or snowmelt on frozen ground in the winter and early spring months, high intensity thunderstorms (usually during the summer months), and

[14] Statewide Regional Evacuation Study Program. Central Florida Region Technical Data Report. Volume 1-7, Chapter II – Regional Hazards Analysis. Available online at http://www.cfrpc.org/EVACUATION%20MASTER%20DVD%20-%20PDF%20VERSION/VOLUME%201/Chapter%202/CFRPC%20Chapter%20II%20-%20Hazards%20Analysis.pdf.

rainfall onto burned areas where high heat has caused the soil to become hydrophobic or water repellent which dramatically increases runoff and flash flood potential.

Flash floods from thunderstorms do not occur as frequently as those from general rain and snowmelt conditions, but are far more severe. The onset of these flash floods varies from slow to very quick and is dependent on the intensity and duration of the precipitation and the soil types, vegetation, topography, and slope of the basin. When intensive rainfall occurs immediately above developed areas, the flooding may occur in a matter of minutes. Sandy soils and sparse vegetation, especially recently burned areas, are conducive to flash flooding. Mountainous areas are especially susceptible to the damaging effects of flash floods, as steep topography may stall thunderstorms in a limited area and may also funnel runoff into narrow canyons, intensifying flow. A flash flood can, however, occur on any terrain when extreme amounts of precipitation accumulate more rapidly than the terrain can allow runoff. Flash floods are most common in Idaho during the spring and summer months due to thunderstorm activity.

Occasionally, floating ice or debris can accumulate at a natural or man-made obstruction and restrict the flow of water**.** Ice and debris jams can result in two types of flooding:

- Water held back by the ice jam or debris dam can cause flooding upstream, inundating a large area and often depositing ice or other debris which remains after the waters have receded. This inundation may occur well outside of the normal floodplain.
- High velocity flooding can occur downstream when the jam breaks. These flood waters can have additional destructive potential due to the ice and debris load that they may carry.[15]

Flooding from ice or debris jams is a relatively common phenomenon in central Idaho and has been a significant contributor to flood-related damages in Idaho County specifically. Small jams frequently occur in many of the streams throughout Idaho County, particularly at bridge abutments and culverts.

Winter weather conditions are the main driving force in determining where and when base floods will occur. The type of precipitation that a winter storm produces is dependent on the vertical temperature profile of the atmosphere over a given area.[16] Unusually heavy snow packs or unusual spring temperature regimes (e.g. prolonged warmth) may result in the generation of runoff volumes significantly greater than can be conveyed by the confines of the stream and river channels. Such floods are often the ones that lead to widespread damage and disasters. Floods caused by spring snow melt tend to last for a period of several days to several weeks, longer than the floods caused by other meteorological sources.

Floods that result from rainfall on frozen ground in the winter, or rainfall associated with a warm, regional frontal system that rapidly melts snow at low and intermediate altitudes (rain-on-snow) can be the most severe. Both of these situations quickly introduce large quantities of water into the stream channel system, easily overloading its capacity.

---

[15] Barnhill, Dave, et al. *"Flash Floods – How do they occur?"*. Waterlines. Division of Water, Indiana Department of Natural Resources. Spring-Summer 1999. Indianapolis, Indiana.

[16] "Snowstorms". Rampo College. Resource Section for Meteorology. Available online at http://mset.rst2.edu/portfolios/k/khanna_n/meteorology/snowstorms.htm. October 2006.

On small drainages, the most severe floods are usually a result of rainfall on frozen ground; however, moderate quantities of warm rainfall on a snow pack, especially for one or more days, can also result in rapid runoff and flooding in streams and small rivers. Although meteorological conditions favorable for short-duration warm rainfall are common, conditions for long-duration warm rainfall are relatively rare. Occasionally, however, the polar front becomes situated along a line from Hawaii through Oregon, and warm, moist, unstable air moves into the region.

The major source of flood waters in Idaho County is normal spring snow melt. As spring melt is a “natural” condition; the stream channel is defined by the features established during the average spring high flow (bank-full width). Small flow peaks exceeding this level and the stream’s occupation of the floodplain are common events. The magnitude of most floods in Idaho County depend on the particular combinations of intensity and duration of rainfall, pre-existing soil conditions, area of a basin, elevation of the rain or snow level, and the amount of snow pack. Man-made changes to a basin also can affect the size of floods. Although floods can happen at any time during the year, there are typical seasonal patterns for flooding in southern Idaho, based on the variety of natural processes that cause floods:

- Heavy rainfall on wet or frozen ground, before a snow pack has accumulated, typically cause fall and early winter floods
- Rainfall combined with melting of the low elevation snow pack typically cause winter and early spring floods
- Late spring floods in Idaho County result primarily from melting of the snow pack

The most commonly reported flood magnitude measure is the “base flood.” This is the magnitude of a flood having a one-percent chance of being equaled or exceeded in any given year. Although unlikely, “base floods” can occur in any year, even successive ones. This magnitude is also referred to as the “100-year Flood” or “Regulatory Flood”. Floods are usually described in terms of their statistical frequency. A "100-year flood" or "100-year floodplain" describes an event or an area subject to a 1% probability of a certain size flood occurring in any given year. This concept does not mean such a flood will occur only once in one hundred years. Whether or not it occurs in a given year has no bearing on the fact that there is still a 1% chance of a similar occurrence in the following year. Since floodplains can be mapped, the boundary of the 100-year flood is commonly used in floodplain mitigation programs to identify areas where the risk of flooding is significant. Any other statistical frequency of a flood event may be chosen depending on the degree of risk that is selected for evaluation, e.g., 5-year, 20-year, 50-year, 500-year floodplain.

The areas adjacent to the channel that normally carry water are referred to as the floodplain. In practical terms, the floodplain is the area that is inundated by flood waters. In regulatory terms, the floodplain is the area that is under the control of floodplain regulations and programs (such as the National Flood Insurance Program which publishes the FIRM maps). The floodplain is often defined as:

"That land that has been or may be covered by floodwaters, or is surrounded by floodwater and inaccessible, during the occurrence of the regulatory flood."[17]

The nature and extent of a flood event is the result of the hydrologic response of the landscape. Factors that affect this hydrologic response include soil texture and permeability, land cover and vegetation, land use and land management practices. Precipitation and snow melt, known collectively as runoff, follow one of three paths, or a combination of these paths, from the point of origin to a stream or depression: overland flow, shallow subsurface flow, or deep subsurface ("ground water") flow. Each of these paths delivers water in differing quantities and rates. The character of the landscape will influence the relative allocation of the runoff and will, accordingly, affect the hydrologic response.

Unlike precipitation and ice formation, steps can be taken to mitigate flooding through manipulation or maintenance of the floodplain. Insufficient natural water storage capacity and changes to the landscape can be offset through water storage and conveyance systems that run the gamut from highly engineered structures to constructed wetlands. Careful planning of land use can build on the natural strengths of the hydrologic response. Re-vegetation of burned slopes diverts overland flow (fast and flood producing) to subsurface flow (slower and flood moderating).

The failure to recognize or acknowledge the extent of the natural hydrologic forces in an area has led to development and occupation of areas that can clearly be expected to flood on a regular basis. Despite this, communities are often surprised when the stream leaves its channel to occupy its floodplain. A past reliance on structural means to control floodwaters and "reclaim" portions of the floodplain has also contributed to inappropriate development and continued flood-related damages.

Development in or near floodplains increases the likelihood of flood damage. New developments near a floodplain add structures and people in flood areas thereby increasing, not the extent of the flood itself, but the impacts or damages that may be caused. New construction can also alter surface water flows by diverting water to new courses or increasing the amount of water that runs off impervious pavement and roof surfaces. This second effect diverts waters to places previously unaffected by flood issues. Unlike the weather and the landscape, this flood-contributing factor can be controlled. Development and occupation of the floodplain places individuals and property at risk. Such use can also increase the probability and severity of flood events (and consequent damage) downstream by reducing the water storage capacity of the floodplain, or by pushing the water further from the channel or in larger quantities downstream.[18]

---

[17] FEMA. Federal Emergency Management Agency. National Flood Insurance Program. Washington D.C. Available online at www.fema.gov.

[18] Planning and Flood Risk. Planning Policy Statement 15. The Planning Service, Department of Environment. June 2006. Available online at http://www.planningni.gov.uk/index/policy/policy_publications/planning_statements/pps15-flood-risk.pdf.

Second Order Hazard Events

With the exception of dam failure, flood events are typically caused by severe weather events such as thunder storms or rapid spring runoff. Idaho County has a high risk of major flood damages; however, flood events can trigger other types of hazard events that may be more damaging than the flood itself. The following chart outlines the interconnection between flood and other types of hazard events.

Table 4.1. Second-Order Hazards Related to Flood Events.

Related Causal Events	Related Effects
Severe Weather	Landslide
Dam Failure	Dam Failure
	Transportation Systems
	Infectious Disease/Epidemic/Pandemic
	Crop Loss
	Power Outage
	Hazardous Materials
	Drinking Water Contamination

Jurisdictional Risk and Vulnerability Assessment

The Idaho County MHMP planning committee reviewed many of the natural and man-made hazards that have affected or pose a potential risk to people or property throughout the County. The committee agreed that the natural hazards of flood, earthquake, landslide, severe weather, and wildland fire as well as the hazards of massive crop failure and extended power outage should be included in the risk assessment for each jurisdiction. The planning committee recognizes that there are additional hazards, particularly man-made hazards, which may also affect Idaho County. These types of additional hazards will be reviewed for inclusion during the subsequent annual and 5-year evaluations of the MHMP.

As part of the risk and vulnerability assessment, each member of the planning committee was asked to fill out a critical infrastructure worksheet identifying and locating all structures, infrastructure, and culturally significant sites that loss or damage of which would have a significant impact on the community. This exercise also included all communication, hazardous materials storage, transportation, and emergency response infrastructure. The list from each member was compiled and added to a GIS database. The critical infrastructure database was used to develop maps and address each type of hazard risk in each jurisdiction.

Furthermore, Idaho County’s existing parcel master listing has been converted to an accessible GIS database. This database allowed the planning committee to map every parcel within the County and City jurisdictions. This data was combined with the hazard vulnerability models to develop the risk assessments and loss estimations for each jurisdiction.

In order to be eligible for project funds under the Flood Mitigation Assistance (FMA) Program authorized by the National Flood Insurance Act of 1968, as amended, communities are required under 44 CFR 79.6(d)(1) to have a mitigation plan that addresses flood hazards. On October 31, 2007, FEMA published amendments to the 44 CFR Part 201 at 72 Federal Register 61720 to incorporate mitigation planning requirements for the FMA program, which combined the Local Mitigation Plan requirement for all hazard mitigation assistances programs under 44 CFR 201.6 to include the FMA as well as the HMGP, PDM, and SRL programs thus eliminating duplicative mitigation planning regulations. The purpose of the flood sections in the following annexes is to fulfill the requirements for both the FMA program and the Local Hazard Mitigation Plan.

Idaho County Annex

Flood Profile

All three types of flood events occur in Idaho County. Riverine flooding occurs along all tributaries to the Snake, Salmon, and Clearwater Rivers. The mountainous terrain that exists throughout much of the County creates a flood-prone environment. Rain-on-snow events can and do occur at almost all elevations across the County. These events often contain enough moisture to cause flooding on the smaller tributaries throughout the County. To a lesser extent, the Snake and Salmon Rivers are also affected by rain on snow events. Due to its large drainage area, the impacts of flood events on the main stem of the Snake River are muted; however, tributaries to the Snake and Salmon Rivers can be greatly influenced by rain on snow events. In general, these flood events can be predicted 24 to 72 hours in advance of the rising waters.

In Idaho County, summer thunderstorms can result in flash flooding of specific smaller drainages. Often there is little time to react to the quickly rising waters. Due to the nature of the terrain within the County, localized flooding from thunderstorms tends to be more of a storm drainage problem for many communities. Short-term blockage of roads is usually the biggest issue as drainage structures are overwhelmed by the rapid influx of water.

Ice/debris flows occur as part of riverine and flash flooding, usually exacerbating the effects of those types of flood events. In the event of a fire, farming, or heavy logging activity, flash flooding and mudslides can result due to the loss of vegetation that usually holds the soil in place and intercepts some of the water’s velocity.

The Snake, Salmon, and Clearwater River drainages are collector watersheds for the Seven Devils Mountain Range and the Clearwater Mountain Range in the eastern part of the County. Numerous smaller tributaries drain into the Snake, Salmon, and Clearwater Rivers including the Lochsa, Selway, South Fork of the Clearwater, Little Salmon, Rapid River, and Middle Fork of the Salmon. Most of these drainages have large, high elevation drainage areas; thus, are heavily influenced by rain-on-snow events. Flash floods have also been recorded, but are not as common.

Many bridge crossings have been identified by the Highway Districts as outdated and inadequate for high water events. Debris often collects on bridge abutments causing water to back up.

A high level of sediment is prevalent in Idaho County drainages during periods of runoff primarily from the abundance of high elevation washouts and agricultural fields in the lowlands. This sediment tends to cause a deteriorating condition in channel beds through erosion and deposition. Natural obstructions to flood waters include trees, brush, and other vegetation along the stream banks in the floodplain areas. Debris can plug culverts and accumulate on bridge abutments at several locations. Many secondary routes are not paved, which results in gravel washing downslope potentially clogging drainage systems or directing water to places that were not intended. Sedimentation and accumulated debris and vegetation are significantly increasing the flood risk throughout Idaho County. Debris jams during high water events have caused considerable flood damage to adjacent properties.

Figure 4.1. Idaho County FEMA Floodplain Map.

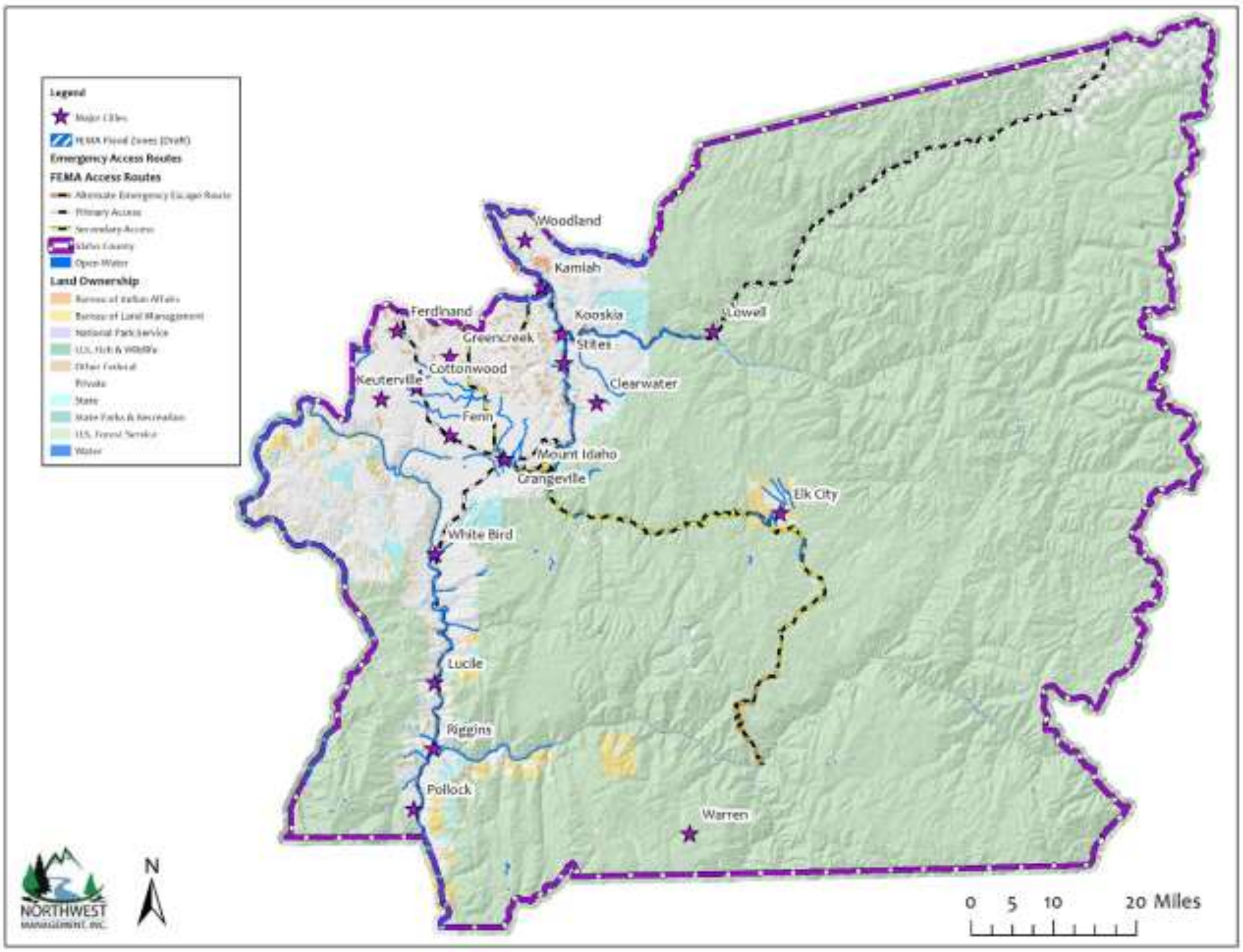


Table 4.2. NFIP Policy Statistics as of 4/12/2015 in Idaho County.						
Community Name	**Policies In-Force**	**Insurance In-Force**	**Written Premium In-Force**	**FIRM Effective Date**	**Floodplain Ordinance/ Manager**	**CRS Ranking**
Idaho County	27	$9,001,500	$57,408	9/27/1991	Kathy Ackerman	NA
City of Grangeville	7	$953,000	$5,878	6/1/1984	Tonya Kennedy	NA
City of Cottonwood	1	$54,000	$526	5/1/1985	Carol Altmon	NA
City of Stites	9	$697,700	$2,269	4/15/1988	Rey Mireles	NA
City of Ferdinand	1	$127,000	$1,461	6/5/1985	Angie Riener	NA
City of Riggins	1	$194,900	$1,676	12/19/1997	Brenda Tilley	NA
City of Kooskia	12	$1,963,100	$14,120	3/18/1985	Charlotte Schilling	NA
City of Kamiah	10	$1,527,500	$7,528	8/19/1985	Joy Perkins	NA
City of White Bird	--	--	--	--	--	--

Participation in the National Flood Insurance Program (NFIP) and subsequent adoption of the Uniform Building Codes, or more stringent local building codes, provide basic guidelines to communities on how to regulate development. When a county participates in the NFIP it enables property owners in the county to insure against flood losses. By employing wise floodplain management, a participating county can protect its citizens against much of the devastating financial loss resulting from flood disasters. Careful local management of development in the floodplains results in construction practices that can reduce flood losses and the high costs associated with flood disasters to all levels of government.

An important part of being an NFIP community is the availability of low cost flood insurance for those homes and businesses within designated flood plains, or in areas that are subject to flooding, but that are not designated as Special Flood Hazard Areas.

Figure 4.2. Floodzones for unincorporated parts of Idaho County.

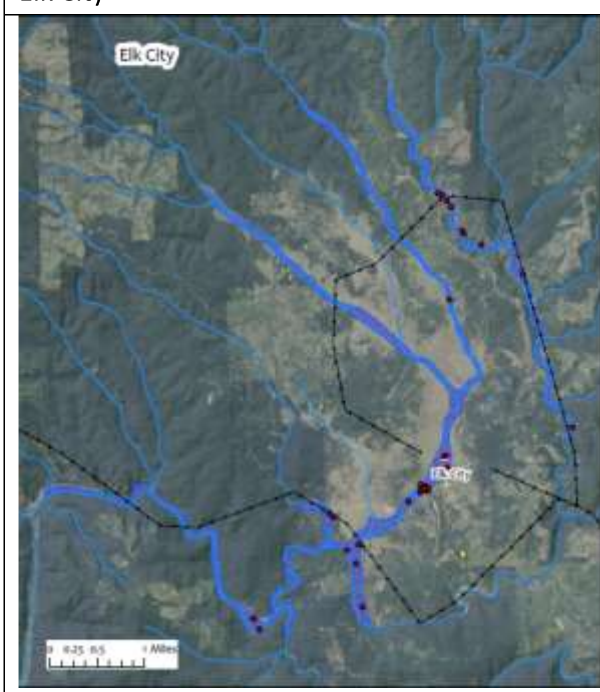
Elk City	Harpster
	

Figure 4.2. Continued.

Lucile	Pollock and Pinehurst
	

Slate Creek


Local Event History

Idaho County has experienced a long history of high magnitude floods, typically by “50 and 100-year” levels. The diverse landscape and weather patterns within Idaho County are the triggers for those high magnitude floods. Rain-on-snow events and above normal high spring temperatures are very typical throughout the county in the spring and late winter. The combination of the above two events are devastating and can cause extraordinary flooding events.

May 23 to June 5, 1948 - The 1948 flood was caused by abnormal snowmelt augmented by rainstorms in the latter part of May and in June. The floods caused contamination of the water system, which left residents without drinking water. Over $3,700,000 damage to roads and highways. $30 Million damage to crops.

A total of 300 people were estimated to be without living quarters in Stites and 100 from Kooskia. Cottonwood Creek flooded Cottonwood 's Main Street. Water supply was cut off to 400 people in and near Riggins when flooding tore out the city's pipelines. Residents were left isolated. Flood Emergency Declared.

December, 1955 - Flooding was extensive in both Adams and Idaho Counties. Riggins lost power, telephone service, and transportation to and from the townsite for approximately three months. They also had difficulty providing fresh water to residents. A huge ice jam at Smokey Boulder near the lower end of New Meadows valley broke loose between Christmas and New Years causing severe damage to infrastructure downstream on the Little Salmon River.

May 21, 1956 - Floodwaters washed over 6,500 acres of farmland. The drinking water became polluted and made it necessary to bring in water from other places. The Clearwater River flooded basements in Orofino.

February 4, 1963 - Cold weather created ice jams and cloudbursts created flooding throughout several counties in the Panhandle. President Kennedy authorized $250,000 in flood relief loans. $4.7 million in damage throughout the state this year. A rock and mud slide 1.5 miles north of Riggins blocked traffic. About 50 families were marooned in the airport area after a pier was washed out.

January 28 to February 3, 1963 - The Lapwai Valley was inundated with flooding after rain and melting snow coursed its way through causing $2 million in damages. The $2 million includes loss of roadways, railroad trackage, livestock, buildings, and personal belongings. Extensive flooding occurred in all streams in the Kooskia, Stites, and Kamiah areas.

January 15, 1974 - Flood waters isolated much of the Coeur d'Alene mining district. The waters burst dams, blocked major roadways, and forced evacuation of at least 1,000 persons. About $65 million in damages were reported. Shoshone and Benewah Counties were the hardest hit. $9.5 million in damage to road systems. $51.4 million in damage to private property. Governor Andrus declared the counties disaster areas. More than 30 bridges were destroyed in 3 counties.

Idaho County incurred about $80,000 in damages. Heavy damage occurred to residential and ranch property and US Highway 95 when the Little Salmon River exploded near Riggins. Additionally, the Lake Creek dam six miles up the Main Salmon River from Riggins failed resulting in severe damage to the River Road.

February 7, 1979 - Melting snow flooded several counties in North Idaho. Many roads were washed out. Schools were shut down and families were evacuated.

Highway 95 was closed by a rockslide near the Idaho-Adams County line. Water was 2 feet deep in Grangeville; however, minimal damage was reported.

August 29, 1986 - Heavy rain flooded city streets in north Idaho. Lightning struck power poles. Gusts of wind were reported as high as 70 mph. About 3.5 inches of rain was dumped in 20 minutes. One person reported having 12 inches of standing water in his garage that left behind 6-7 inches of mud. Highway 62 was flooded about 15 miles south of Kamiah. 8 people were stranded by the wash-out. Drinking water was contaminated from the muddy runoff.

February 11, 1996 - A combination of existing snow, ten inches of new snow, and single digit temperatures the last week of January caused ice to form on many rivers. This was followed by a warming pattern the first week of February and resulted in flooding in the northern panhandle counties. The overall disaster damages exceeded $100 million.

In Idaho County, Cottonwood Creek near the town of Stites overflowed its banks and water crossed Highway 12. Three railroad cars were welded together to make a temporary bridge on Highway 12 over Cottonwood Creek. Roads near Lowell were closed due to mudslides.

January 1 to 5, 1997 - New Year's day floods in the Weiser, Payette and Salmon River drainages of southwestern Idaho caused record flooding and numerous mudslides. Warm temperatures combined with a rainfall 4-6 times the normal amount; the resulting snowmelt triggered devastating floods, mudslides and avalanches, extensively damaging communities and infrastructure throughout Idaho. The community of South Banks was condemned because of extensive slide damage. Over 400 miles of roads and several railroad lines were blocked or destroyed, stranding over 10,000 holiday travelers in western Idaho. Residents of McCall, Cascade, Banks, Lowman and Garden Valley were isolated. Rivers were "running like chocolate," carrying huge trees, mud and boulders; the Snake River at Hells Canyon Dam crested at 101,728 cfs January 1, nearly 30,000 cfs over its previous record level on 2/23/82. The crash of a plane carrying 5 people from Boise to McCall, killing all, was a result of the weather. Power and telephone services were cut in the Riggins area. Slides closed Highways 64 and 162.

Governor Batt declared 13 counties a disaster: Gem, Adams, Washington, Idaho, Clearwater, Valley, Payette, Elmore, Latah, Boundary, Bonner, Shoshone and Boise. A Federal disaster was declared on January 4, 1997. The total cost of the disaster was $65,000,000.00 with $2,731,796 of that damage occurring in Idaho County.

May 13, 2008 - High water in the Clearwater River system, including the Selway, Lochsa, Middle Fork and South Fork of the Clearwater River and associated watersheds throughout the Clearwater River Basin are predicted to exceed bankfull conditions and threaten the flooding of public and private property, structures, roadways, infrastructures and public utilities in the municipalities of Kooskia and Stites and in unincorporated areas along the Clearwater River in Idaho County, Idaho.

Spring, 2010 - Small stream, flash floods took out roads and culverts east/south-east of Kooskia (Clear Creek; Leitch Creek) causing approximately 30 infrastructure project repairs ultimately funded by FEMA.

Spring, 2011 – A rain on snow event caused extensive damage to infrastructure (roads, bridges, and culverts) throughout the county but particularly in the Good Roads, Keuterville, and Deer Creek Highway Districts.

Probability of Future Occurrence

The probability of flood events occurring in Idaho County is high. Low magnitude flood events can be expected several times each year. However, due to various flood control measures and drainage infrastructure, the impacts of these events in unincorporated areas are slight and usually amount to minor and temporary traffic issues throughout the County. Larger magnitude and high impact flood events have occurred, but are not likely in any given year. These types of flood events have the highest probability of occurrence in the winter or early spring and often have a greater impact on the cities of Kamiah, Riggins, White Bird, Grangeville, Cottonwood, Kooskia, and Stites. Minor flash flood events are expected annually most likely as a result of summer thunderstorms or rain-on-snow events.

The main stem of the Salmon River does not usually cause significant flooding problems; however, the potential for severe damage exists. The U.S. Highway 95 route from Riggins to White Bird parallels the path of the river. Extremely high water flows could begin undercutting the roadway causing severe damage and potential isolation of communities in the Salmon River canyon. Furthermore, much of the canyon itself is susceptible to both small and large scale landslides. A slide causing even partial blockage of the channel would cause not only the highway, but numerous individual homesites to be inundated with backed up floodwaters. The communities of White Bird, Slate Creek, Lucile, and Riggins could be at risk if this type of event were to occur.

The Little Salmon River heads in the Meadows Valley in Adams County and flows northward to its confluence with the Salmon River at Riggins. Major tributaries include Goose Creek, Hazard Creek, Boulder Creek, and Rapid River. The drainage area is 516 square miles and includes elevations from 1,760 feet at the mouth to 9,000 feet in the Seven Devils Mountains and Hazard Creek drainages.

The Little Salmon River travels through a very narrow canyon before discharging into the Salmon River at Riggins. Any kind of blockage such as a log or debris jam or slide could cause water to back up and potentially flood homes and Highway 95 in the canyon. The New Year’s flood of 1997 caused severe damages to communities and homes in the Little Salmon River canyon. Many homes and other structures along the river were completely flooded and in a few cases washed away. A combination of floodwaters and mudslides along the Highway 95 corridor cut off access along this route and resulted in very high repair costs.

Only a short section of the Clearwater River from Kooskia to Kamiah is within Idaho County. Both the Kooskia and Kamiah bridges were built to withstand nearly any kind of flood event; thus, the main stem of the Clearwater River will not likely cause serious flooding or damage in Idaho County. The Middle Fork and South Fork of the Clearwater River have a much higher probability of causing flood damage to area residents and communities. Although the USGS data is limited for the South Fork, it is clear that the 1964 flood was well outside the normal range of peak flows for the river. The 1996 and 1997 floods also show up as being above average peak flows. Due to the density of development as well as the lack of structurally sound levees, the communities of Kooskia, Harpster, and Stites as well as several individual residences along the South Fork of the Clearwater have a high risk to flood events.

The Lochsa River has its origins in the Bitterroot Mountains near the Idaho-Montana border and drains 1,182 square miles. The USGS peak flow data shows that there has been numerous years where peak flows are above the normal range of variability. This suggests that the Lochsa River and its tributaries respond to heavy rains and potential flash flood events more frequently than the larger Middle Fork and South Fork drainages. This scenario is likely true for the Selway River as well. Deep snowpack in the Bitterroot Mountains will also heavily influence peak flows on these drainages.

There are currently no repetitive loss properties or special flood hazard areas in unincorporated Idaho County.

Impacts of Flood Events

Due to several swift bodies of water in Idaho County, the probability of a flood-related fatality is moderate. Flash flood events in particular, or accidents, could result in a death or injury. First responders or other persons could be pinned under debris and drowned or receive trauma from debris being carried along the waterway. Once flood waters recede, mold can grow in wet material causing a public health hazard. Flood waters may contain sewage and hazardous chemicals that could be left on people’s property following a flood event. Furthermore, water and food may be contaminated and heat and electricity may be inoperable for a period of time. Although the probability of these types of impacts occurring at a moderate to large scale is very low, all of these factors could contribute to a decline in current and long term health of Idaho County residents.

The continuity of operations for Idaho County and most other jurisdictions within the county will not be compromised due to a flood event. The delivery of some services may be hindered by localized flooding in certain areas; however, due to the availability of alternative routes, this is not a significant concern. Damage to facilities, equipment, or files could impact certain organizations or public services depending on the extent of damage and duration of the event.

Elk City’s existing wastewater treatment lagoons are located along and share a common dike with Big Elk Creek, the primary surface water feature in the city. According to the FIRM, the entirety of the lagoons lies within the 100-year floodplain. Elk City locals have indicated that while they have never physically observed the Creek overflowing the lagoon dikes, it has come very close many times.[19]

A major flooding event in the area of the wastewater lagoons would likely result in overtopping of the lagoon dikes, producing both an environmental disaster, and a severe health risk to residents of Elk City and downstream water users. In order to mitigate these risks, Elk City has identified two alternatives which can be found in the Wastewater Facility Plan (June 2015)[19] for Elk City and included in the list of Action Items located in Table 6.10.zz

Flood events in Idaho County are most likely to affect private property by damaging homes, businesses, barns, equipment, livestock, and vehicles. Both water and contaminants can damage or permanently ruin equipment. Flood waters can also erode land. This is particularly an issue when lands supporting roads, power lines, pipelines, sewage control facilities, levees, bridges, and other infrastructure are damaged by erosion.

In Idaho County, it is unlikely that flood events would cause any long-term environmental impacts. Some environmental impacts that may be realized by localized flooding could include erosion of stream banks, loss of riparian plant life, or contamination by chemicals or sewage. Flooding in some areas may have some environmental benefits such as establishing meanders that slow the stream flow, replenishing wetland areas, and replenishing the soil with nutrients from sediment.

Flooding in Idaho County is likely to have a significant or long-term effect on the local economy. Depending on the magnitude of the event, individual residents and businesses may be adversely impacted, but the economic viability of the community will not be affected. Severe damage to transportation infrastructure may have a short-term impact on certain communities due to the presence of state and U.S. highway routes, but alternative routes are available.

Value of Resources at Risk

There are approximately 469 structures within the FEMA-identified floodplains (100- and 500-year) in unincorporated Idaho County, yielding a total structure value of nearly $37.2 million. The structural value is based on the County's assessed value of property improvements and does not reflect the replacement cost of a structure. According to Idaho County Disaster Management, there are currently no repetitive loss properties within Idaho County. The average damage to structures was estimated based on the parcel's location as either completely within or out of the flood zone. The estimated value of contents is ½ the value of the improvements equating to an additional $18.6 million in potential losses. In reality, the damages will most likely not be equally distributed between buildings based on building materials, building location, and flood location. However, these estimates provide a basic approximation.

The Elk City wastewater facility is one identified critical infrastructure located within the identified floodplain for unincorporated Idaho County. The above numbers are extremely crude. The Idaho County

[19] Mountain Waterworks, Inc. Wastewater Facility Plan (Draft). 2015. Prepared for Elk City Water and Sewer Association.

Assessor's office provided specific information regarding each parcel, however, it was not in a format conducive to summarization.

Individual Community Assessments

The following assessments were written for communities (both incorporated and unincorporated areas) that have assets at risk within the 100 year flood zone (according to the FEMA Flood Insurance Rate Maps). Assessments generally focus on people, structures, and infrastructure within the Emergency Service Number boundary for each community; nevertheless, where applicable, influences and/or critical facilities and infrastructure in the surrounding area were also assessed. The Emergency Service Number boundary does not equate to the actual city boundaries; however, in most cases, it is similar.

City of Grangeville

Flood Profile

The main Three Mile Creek is a tributary of the South Fork of the Clearwater River and joins it at River Mile 7.6. Long Haul Creek flows into Cottonwood Creek, which joins the South Fork of the Clearwater River at River Mile 4.7. These streams flow to the north from the east-west trending ridge of White Bird Hill. The watershed area is generally forested above the 4,000 foot elevation to the highest point of 6,123 feet. The area below 4,000 feet is primarily pasture and hayland. The five channels run nearly parallel through town with gradients ranging from 120 feet per mile on the Middle Fork Three Mile Creek to 155 feet per mile on the West Fork Three Mile Creek.

The East Fork Three Mile Creek joins the main channel downstream of the Grangeville city limits. The main Three Mile Creek separates into the Middle Fork and the West Fork near the intersection of Hall Street and West North 4th Street.

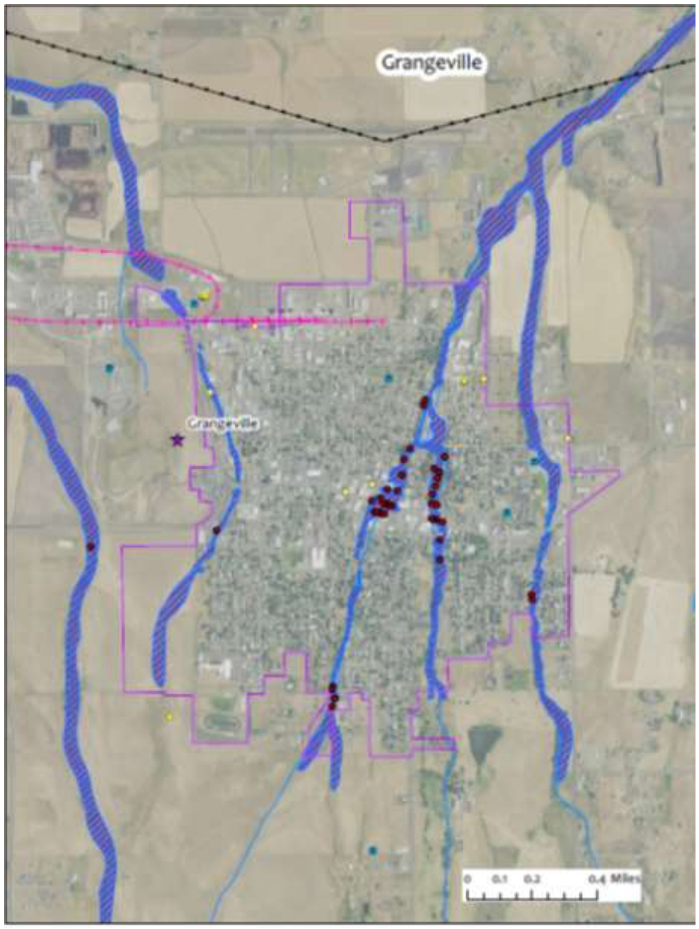
Grangeville is normally subject to spring rain runoff flooding. Occasionally rain on snow with frozen or saturated soils will cause floods during the winter months. Trash and debris may cause an increase in flood elevations by plugging culverts and bridge openings. Gravel bars may develop which will raise the channel bottom and reduce the channel flow area. Approximately 20 acres are subject to inundation by 100-year floods.

Thunderstorms are localized summer events that can also have an impact on the flooding potential of Grangeville. Although thunderstorms don't pose a significant impact of the community of Grangeville, awareness of the potential risks of thunderstorms is very valuable. Storms resulting in intense rain fall often occur rapidly and overwhelm the carrying capacity of the nearby streams. The duration of subsequent flooding tends to be a matter of hours.

The major impacts from all types of flooding in Grangeville are the restricted use of roadways and bridges. The main culverts that direct the creeks could restrict water flow, consequently backing up water onto the adjacent area. Some streets are not paved, which results in gravel washing down-slope potentially clogging sewer and storm drains. Sewer and storm drains could fill quickly, consequently backing up these lines and restricting the flow of water.

Numerous structures and businesses still operate near the floodplain, but have not been significantly influenced. .

Figure 4.3. Floodzone for Grangeville.



The primary access routes into Grangeville are Highway 95, Highway 13, and Mt. Idaho Grade. Highway 95 is the main route connecting north and south Idaho. This highway is well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highway 95 through Idaho County is adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. This highway also traverses several steep draws and crosses major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around Grangeville to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate Grangeville vicinity due to flooding. Although road closures due to flooding are not uncommon.

During major flood events, there is also a high risk of water backing up the sewer system. Inflow exceeding the pumping capacity of the headworks could lead to a backup that would cause flooding into basements

and adjacent properties as well as standing water near transmission lines. The overall impact and damages caused by a sewer backup may be greater than the initial flood event.

Local Event History

Heavy rains and spring runoff have caused several flood events in Grangeville. Although there have been no recent major flood events, Grangeville has had flood events in the past. The following flood descriptions occurred throughout the county, not just in the city of Grangeville.

A flood in 1870 appears to have had the largest volume evidenced by the debris deposited in the channel northeast of town; however, no useful data is available on this flood. A flood on May 31st, 1917, occurred after nearly five inches of rain fell during the month. The culvert under Main Street was plugged which caused additional flood damage. The most damaging flood occurred on May 21st, 1921. A druggist was trapped in the basement of his store and drowned. Main Street from Hall to State Streets was flooded and was reported to be under two feet of water. This flood was also the result of extensive rain. The rodeo grounds were flooded on May 22nd, 1948. During this same flood, the Middle Fork Three Mile Creek overwhelmed a bridge on the north side of the city and flooded three properties. This flood was also the result of extensive rain fall.

A winter flood occurred on December 21st, 1955, and was the result of a large, warm air mass moving in and centering over the area. Earlier precipitation fell as snow on saturated soil. The total precipitation from October through December was 11.7 inches. The combination of warm air and rain with the heavy snowpack caused flooding over an extensive area. Six businesses had flooding in the basements and first floor level. The greatest damages were reported along the West Fork Three Mile Creek. Hall Street was reported to have been severely eroded. Culverts and grates were reportedly clogged with debris. No dollar amounts were estimated for damages. The April 9th, 1964 flood damaged four businesses on Main Street. The flood was a result of spring rains on saturated soils. The flood of December 3rd, 1975 inundated Main Street from Hall to State Streets. The flooding was a result of 0.9 inches of precipitation in the ten days prior with extremely low temperatures during this same period. There was a deep snowpack on the north facing slopes and just prior to the flood, a warm, moist air mass moved into the area and melted the snow. Ice reportedly plugged culverts, but no damage was reported.

Probability of Future Occurrence

The probability of flood events occurring in Grangeville is moderate to high. Low magnitude flood events can be expected several times each year, particularly along Three Mile and Long Haul Creeks within the city limits. However, due to the flat topography and drainage infrastructure, the impacts of these events are slight and will usually amount to minor and temporary traffic issues. Larger magnitude and high impact flood events have occurred, but are not likely in any given year. These types of flood events have the highest probability of occurrence in the winter or early spring in Grangeville. Minor flash floods are common on the numerous small tributaries feeding Three Mile and Long Haul Creeks near the community, but are not likely to have a significant impact on the channel within the city center.

Impacts of Flood Events

The potential impacts from flooding in Grangeville are very similar to the impacts described for Idaho County as a whole. First responders and other volunteers aiding with emergency flood control or cleanup efforts are potentially at risk of injury due to accidents or possibly exposure to contaminated water. Although unlikely, the city's water supply could be affected by contaminated flood waters entering the groundwater supply.

Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The major impacts from flooding in Grangeville are the restricted use of several streets, commercial, and residential areas due to overburden of existing drainage facilities. Three Mile and Long Haul Creeks, and their tributaries, run through culverts under much of the City and many culverts and bridges exist within the surrounding area.

The availability of food and other supplies is not likely to be impacted or interrupted by a flood event. Furthermore, the delivery of community services such as postal services, health care, law enforcement, and emergency response is also not likely to be impacted by flood events in Grangeville. While individual homes and businesses may incur damages as a result of a flood, the economy of the community will not likely be impacted by this type of hazard.

Environmental damages resulting from a flood event are also unlikely. Three Mile and Long Haul Creeks occupy a relatively wide floodplain through the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are 42 structures within the city limits of Grangeville that are in the flood zone. Using the average improvement value for Grangeville of $97,016 makes the potential loss for Grangeville around $4,074,672 for assessed value of structures with an additional $2,037,336 in contents.

There are no critical infrastructure located within the identified floodplain for Grangeville.

City of Ferdinand

Flood Profile

Ferdinand is located on the edge of the Camas prairie with relatively flat to gently rolling terrain. There are no major creeks or rivers in the immediate area. There are some minor drainages that drain the agriculture fields surrounding Ferdinand which drain to the north and into Lawyer Creek.

Ferdinand is potentially subjected to spring rain runoff flooding. Occasionally rain on snow with frozen or saturated soils will cause floods during the winter months. Trash and debris may cause an increase in flood elevations by plugging culverts and bridge openings.

Thunderstorms are localized summer events that can also have an impact on the flooding potential of Ferdinand. Although thunderstorms don't pose a significant impact of the community of Ferdinand, awareness of the potential risks of thunderstorms is very valuable. Storms resulting in intense rain fall often occur rapidly and overwhelm the carrying capacity of the nearby streams. The duration of subsequent flooding tends to be a matter of hours.

The major impacts from all types of flooding in Ferdinand are the restricted use of roadways and bridges. The main culverts that direct the creeks could restrict water flow, consequently backing up water onto the adjacent area. Some streets are not paved, which results in gravel washing down-slope potentially clogging sewer and storm drains. Sewer and storm drains could fill quickly, consequently backing up these lines and restricting the flow of water.

Numerous structures and businesses still operate near the floodplain, but have not been significantly influenced. .

The primary access routes into Ferdinand is Highway 95. Highway 95 is the main route connecting north and south Idaho. This highway is well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highway 95 through Idaho County is adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. This highway also traverses several steep draws and crosses major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around Ferdinand to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate Ferdinand vicinity due to flooding. Although road closures due to flooding are not uncommon.

Local Event History

No major flooding events have occurred in Ferdinand.

Probability of Future Occurrence

The probability of flood events occurring in Ferdinand is low. Low magnitude flood events can be expected several times each year, particularly where culverts become plugged. However, due to the flat topography and drainage infrastructure, the impacts of these events are slight and will usually amount to minor and temporary traffic issues. Minor flash floods are common on the numerous small tributaries feeding Lawyer Creek near the community, but are not likely to have a significant impact on the city center.

Impacts of Flood Events

The potential impacts from flooding in Ferdinand are very similar to the impacts described for Idaho County as a whole. Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The major impacts from flooding in Ferdinand are the restricted use of some streets due to overburden of existing drainage facilities.

The availability of food and other supplies is not likely to be impacted or interrupted by a flood event. Furthermore, the delivery of community services such as postal services, health care, law enforcement, and emergency response is also not likely to be impacted by flood events in Ferdinand. While individual homes and businesses may incur damages as a result of a flood, the economy of the community will not be impacted by this type of hazard.

Environmental damages resulting from a flood event are also unlikely. Intermittent streams in the region occupy a relatively wide floodplain near the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are 14 structures within the city limits of Ferdinand that are in the flood zone. Using the average improvement value for Ferdinand of $72,951 makes the potential loss for Ferdinand around $1,167,216 for assessed value of structures with an additional $583,608 in contents.

There are no critical infrastructure located within the identified floodplain for Ferdinand.

City of Cottonwood

Flood Profile

The city of Cottonwood is located along U.S. Highway 95 near the western extent of the Camas Prairie. Cottonwood Creek flows out of the Cottonwood Butte watershed area eastward through the city and continues across the Prairie to eventually drain into the South Fork of the Clearwater near Stites.

Cottonwood Creek flows along its natural course; however, much of its path through downtown Cottonwood is diverted to an underground system. The Cottonwood Creek channel as well as the stormwater drainage system carrying runoff beneath the commercial district is insufficient to handle a major flood event. Additionally, willow trees growing in the riparian area are beginning to clog Cottonwood Creek both in the downtown area and along the southeast edge of the town exacerbating potential flood issues.

Cottonwood is normally subject to spring rain runoff flooding. Occasionally rain on snow with frozen or saturated soils will cause floods during the winter months. Trash and debris may cause an increase in flood elevations by plugging culverts and bridge openings. Gravel bars may develop which will raise the channel bottom and reduce the channel flow area. Approximately 20 acres are subject to inundation by 100-year floods.

Thunderstorms are localized summer events that can also have an impact on the flooding potential of Cottonwood. Although thunderstorms don’t pose a significant impact of the community of Cottonwood, awareness of the potential risks of thunderstorms is very valuable. Storms resulting in intense rain fall often occur rapidly and overwhelm the carrying capacity of the nearby streams. The duration of subsequent flooding tends to be a matter of hours.

The major impacts from all types of flooding in Cottonwood is that commerce may be disrupted and distribution of basic services such as emergency response and postal services are likely slowed. Electrical service may also be impacted as power is shut off in flooded areas to prevent electric shock. The lack of electricity could become a secondary hazard as the ability of residents to cook or provide heat is halted. Previous flood events have compromised or damaged the city’s sewer system as well as the chlorine basin for wastewater treatment due to increased stormwater. Some streets are not paved, which results in gravel washing down-slope potentially clogging sewer and storm drains. Sewer and storm drains could fill quickly, consequently backing up these lines and restricting the flow of water.

The Cottonwood Creek floodplain will not likely isolate the community; however, it could have significant impacts on major access routes. In the event that the underground section of the creek was damaged or overwhelmed, much of the downtown area along Main and King Street would likely flood. This could cut off residents' access to groceries, the Post Office, and city government buildings. The Nuxoll fuel station, Reiner's grocery store, the fire station, and a small portion of St. Maries Hospital are directly within the 100-year floodplain. Furthermore, Cottonwood Creek passes beneath Highway 95 near the southern entrance to the community.

Several structures and businesses still operate near the floodplain, but have not been significantly influenced.

Figure 4.4. Floodzone for Cottonwood.

The primary access route into Cottonwood is Highway 95. Highway 95 is the main route connecting north and south Idaho. This highway is well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highway 95 through Idaho County is adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. This highway also traverses several steep draws and crosses several major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around Cottonwood to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate Cottonwood vicinity due to flooding. Although road closures due to flooding are not uncommon.

During major flood events, there is also a high risk of water backing up the sewer system. Inflow exceeding the pumping capacity of the headworks could lead to a backup that would cause flooding into basements and adjacent properties as well as standing water near transmission lines. The overall impact and damages caused by a sewer backup may be greater than the initial flood event.

Local Event History

Heavy rains and spring runoff have caused several flood events in Cottonwood. The most recent major flood event was recorded in 2014 where a rain on snow event on Cottonwood Butte plugged culverts in town and washed out Maple Street.

Probability of Future Occurrence

The city of Cottonwood has a high risk of flood damage due to the potential failure of the underground portion of the Cottonwood Creek channel and an inadequate storm drainage system beneath the city's commercial district. Low magnitude flood events can be expected several times each year, particularly along Cottonwood and Graves Creeks within the city limits. However, due to the flat topography and drainage infrastructure, the impacts of these events are slight and will usually amount to minor and temporary traffic issues. Larger magnitude and high impact flood events have occurred, but are not likely in any given year. These types of flood events have the highest probability of occurrence in the winter or early spring in Cottonwood. Minor flash floods are common on the numerous small tributaries feeding Cottonwood Creek near the community, but are not likely to have a significant impact on the channel within the city center.

Impacts of Flood Events

The potential impacts from flooding in Cottonwood are very similar to the impacts described for Idaho County as a whole. First responders and other volunteers aiding with emergency flood control or cleanup efforts are potentially at risk of injury due to accidents or possibly exposure to contaminated water. Although unlikely, the city's water supply could be affected by contaminated flood waters entering the groundwater supply.

Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The major impacts from flooding in Cottonwood are the restricted use of several streets, commercial, and residential areas due to overburden of existing drainage facilities. Both Cottonwood Creek and Graves Creek, and their tributaries, run through culverts under much of the City and many culverts and bridges exist within the surrounding area.

The availability of food and other supplies is not likely to be impacted or interrupted by a flood event. Furthermore, the delivery of community services such as postal services, health care, law enforcement, and emergency response is also not likely to be impacted by flood events in Cottonwood. While individual homes and businesses may incur damages as a result of a flood, the economy of the community will not be impacted by this type of hazard.

Environmental damages resulting from a flood event are also unlikely. Cottonwood and Graves Creeks occupy a relatively wide floodplain through the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are 16 structures within the city limits of Cottonwood that are in the flood zone. Using the average improvement value for Cottonwood of $91,960 makes the potential loss for Cottonwood around $1,471,360 for assessed value of structures with an additional $735,680 in contents.

The Cottonwood Fire Department is one identified critical facility located within the identified floodplain for Cottonwood.

City of Riggins

Flood Profile

The city of Riggins is located at the confluence of the Main Salmon River and the Little Salmon River. The town lies on a narrow strip of land between the base of the slope and river. The Little Salmon River flows along Highway 95 south of Riggins and the Salmon River roughly parallels Highway 95 north of town.

Riggins is normally subject to spring rain runoff flooding. Occasionally rain on snow with frozen or saturated soils will cause floods during the winter months. Trash and debris may cause an increase in flood elevations by plugging culverts and bridge openings. Gravel bars may develop which will raise the channel bottom and reduce the channel flow area. Approximately 20 acres are subject to inundation by 100-year floods.

Thunderstorms are localized summer events that can also have an impact on the flooding potential of Riggins. Although thunderstorms don't pose a significant impact of the community of Riggins, awareness of the potential risks of thunderstorms is very valuable. Storms resulting in intense rain fall often occur rapidly and overwhelm the carrying capacity of the nearby streams. The duration of subsequent flooding tends to be a matter of hours.

The major impact from flooding in Riggins is the inundation of water into several residential areas, a significant portion of the city's commercial district on the east side of Highway 95, and the potential for water to overtop U.S. Highway 95, which is the primary access route in the area. The 100-year floodplain in this area includes several sections of the highway along the Little Salmon River and two sections along the Salmon River on the north side of town near Bullseye Corner and the river-access parking facility. Furthermore, the bridge at the confluence of Rapid River and the Little Salmon River and at the junction of Highway 95 and the Salmon River Road could also be at risk during flood events. Disruption of traffic on Highway 95 would significantly impact inter- and intrastate traffic and affect food, fuel, and other deliveries to the many Idaho County communities.

Several structures and businesses still operate near the floodplain, but have not been significantly influenced.

Figure 4.5. Floodzone for Riggins.

The primary access route into Riggins is Highway 95. Highway 95 is the main route connecting north and south Idaho. This highway is well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highway 95 through Idaho County is adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. This highway also traverses several steep draws and crosses several major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around Riggins to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate Riggins vicinity due to flooding. Although road closures due to flooding are not uncommon.

During major flood events, there is also a high risk of water backing up the sewer system. Inflow exceeding the pumping capacity of the headworks could lead to a backup that would cause flooding into basements

and adjacent properties as well as standing water near transmission lines. The overall impact and damages caused by a sewer backup may be greater than the initial flood event.

Local Event History

Heavy rains and spring runoff have caused several flood events in Riggins. Although there have been no recent major flood events, Riggins has had flooding in the past. During the New Year's Day Flood of 1997, an accumulation of snow followed by a warming trend with rain resulted in landslides and floods on every creek along the Salmon River including the Little Salmon River. This event caused the loss of power and phone lies for nearly three weeks throughout the Riggins area. Highway 95 as well as several secondary routes were also severely damaged both north and south of town. Homes and other property were washed away and truck deliveries supplying food and fuel were halted due to the extreme flooding. An abandoned home damaged and moved downstream by the 1997 New Years Day Flood sits on an island in the Little Salmon River approximately ½ mile upstream of the Salmon River Road bridge. If a flood event moved this structure further downstream, it is possible the house would crash into the bridge causing not only structural damage, but additional debris build up at a vulnerable location for the city.

Probability of Future Occurrence

The city of Riggins, particularly on the south end, has a high risk of flood damage as has been demonstrated by past events. Low magnitude flood events can be expected several times each year, particularly along Little Salmon River within the city limits. Due to the steep topography and narrow walls, the impacts of these events could be extreme and may amount to significant traffic issues. Larger magnitude and high impact flood events have occurred, but are not likely in any given year. These types of flood events have the highest probability of occurrence in the winter or early spring in Riggins. Minor flash floods are common on the numerous small tributaries feeding Little Salmon and Salmon Rivers near the community, but are not likely to have a significant impact on the channel within the city center.

Impacts of Flood Events

The potential impacts from flooding in Riggins are very similar to the impacts described for Idaho County as a whole. First responders and other volunteers aiding with emergency flood control or cleanup efforts are potentially at risk of injury due to accidents or possibly exposure to contaminated water. Although unlikely, the city's water supply could be affected by contaminated flood waters entering the groundwater supply.

Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The major impact from flooding in Riggins is the inundation of water into several residential areas, a significant portion of the city's commercial district on the east side of Highway 95, and the potential for water to overtop U.S. Highway 95, which is the primary access route in the area. The 100-year floodplain in this area includes several sections of the highway along the Little Salmon River and two sections along the Salmon River on the north side of town near Bullseye Corner and the river-access parking facility. Furthermore, the bridge at the confluence of Rapid River and the Little Salmon River and at the junction of Highway 95 and the Salmon River Road could also be at risk during flood events. Disruption of traffic on Highway 95 would significantly impact inter- and intrastate traffic and affect food, fuel, and other deliveries to the many Idaho County communities.

Flooding of any public facilities will impact residents of Riggins as commerce is disrupted and distribution of basic services such as emergency response and postal services are slowed. Electrical service may also be impacted as power is shut off in flooded areas to prevent electric shock. The lack of electricity could become a secondary hazard as the ability of residents to cook or provide heat is halted. Additionally, grocery and petroleum outlets may be closed or contaminated, which may lead to a lack of fresh drinking water and food sources as well as residents' inability to leave the area. Any amount of flooding typically causes damage to structures. Much of the damage may be cosmetic, but still very costly. More extreme damage may be caused as river and stream channels migrate or infrastructural components, such as bridges or municipal wells, are destroyed.

Environmental damages resulting from a flood event are also unlikely. Salmon, Little Salmon and Rapid Rivers occupy a relatively narrow floodplain through the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are 85 structures within the city limits of Riggins that are in the flood zone. Using the average improvement value for Riggins of $106,848 makes the potential loss for Riggins around $9,082,080 for assessed value of structures with an additional $4,541,040 in contents.

There are no critical infrastructure located within the identified floodplain for Riggins.

City of Stites

Flood Profile

The city of Stites is a small community located along the South Fork of the Clearwater River a few miles upstream of Kooskia.

Stites' flooding problems are due primarily to the overflow of the South Fork Clearwater River. South Fork Clearwater River flows into the city from the south along the western city limits and out of the city through the northern city limits. Cottonwood Creek also drains into the South Fork of the Clearwater River at Stites.

The city of Stites is protected from the South Fork Clearwater River by a levee, which was built in 1974 by the COE. The levee was designed to protect the city from a 40-year flood. For the purposes of the National Flood Insurance Program, only levees providing 100-year flood protection are considered; thus, the 100-year flood boundaries were computed disregarding the Stites levee.

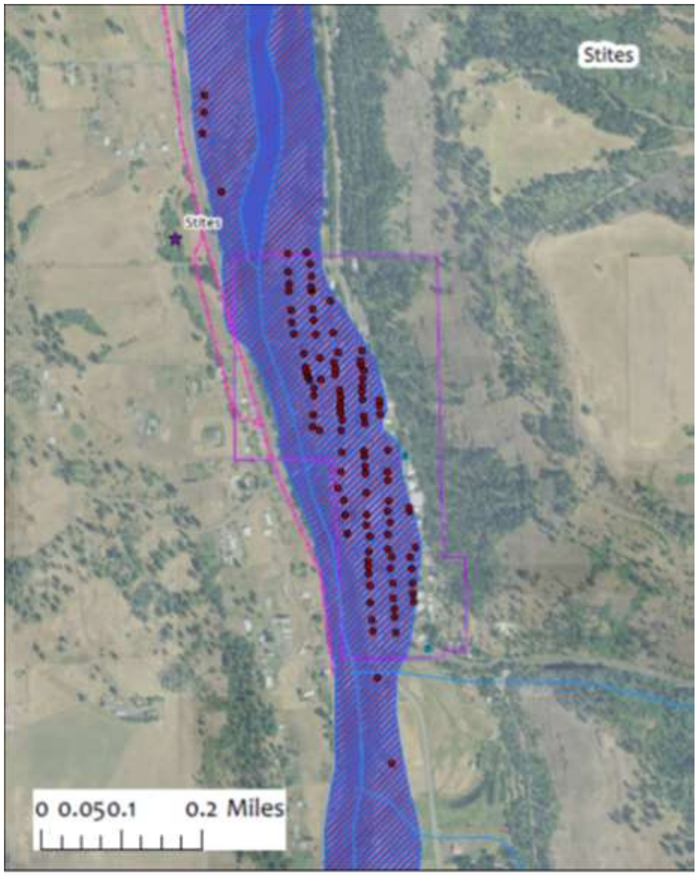
Nearly all of Stites on the east bank of the river and portions on the west bank is within the 100-year floodplain including the commercial district, all city facilities and emergency services, and a large section of State Route 13, which passes through the middle of town.

Floods in Stites are generally the result of three different types of weather events, rain-on-snow, snowmelt and thunderstorms. Rain-on-snow events that affect the town occur when significant snow pack exists in the Clearwater Mountains. Warm rains falling on the snow pack result in a significantly increased rate of snowmelt. Often this melting occurs while the ground is frozen and the water cannot be absorbed into the soil, resulting in increased overland flows. Additionally, many of the smaller tributaries such as Cottonwood Creek can be significantly impacted by thunderstorms causing flash flooding and putting many homes and roadways at risk. Floods from thunderstorms do not occur as frequently as those from general rain and snowmelt conditions, but they can be far more severe.

The major impacts from all types of flooding in Stites are the restricted use of roadways and bridges. The main culverts that direct the creeks could restrict water flow, consequently backing up water onto the adjacent area. Some streets are not paved, which results in gravel washing down-slope potentially clogging sewer and storm drains. Sewer and storm drains could fill quickly, consequently backing up these lines and restricting the flow of water.

Numerous structures and businesses still operate near the floodplain, but have not been significantly influenced. .

Figure 4.6. Floodzone for Stites.



The primary access routes into Stites is Highway 13 and Highway 12. Highway 12, just north of Stites, is the main east and west route connecting Lewiston, Idaho with Missoula, Montana. This highway is well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highways 12 and 13 through Idaho County are adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. These highways also traverse several steep draws and cross major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions such as, Cottonwood Creek Canyon, Lamb Creek, and Stites Grade Road. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around Stites to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate Stites vicinity due to flooding. Although road closures due to flooding are not uncommon.

During major flood events, there is also a high risk of water backing up the sewer system. Inflow exceeding the pumping capacity of the headworks could lead to a backup that would cause flooding into basements

and adjacent properties as well as standing water near transmission lines. The overall impact and damages caused by a sewer backup may be greater than the initial flood event.

Local Event History

Heavy rains and spring runoff have caused several flood events in Stites. The most recent major flood events were recorded in 2010 when a Presidential Disaster was declared for flooding near Stites. Small stream, flash floods took out roads and culverts east and south-east of Kooskia (Clear Creek; Leitch Creek) which caused over 30 infrastructure project repairs ultimately funded by FEMA.

The largest flow recorded at the USGS stream gaging station located near the south end of town on the west bank of the South Fork Clearwater River occurred on June 8th, 1964. The discharge was 17,500 cubic feet per second (cfs) from a drainage area of 1,150 square miles. The water rose to an elevation of 1,322 feet at the gage. This flood had a probability of .017% of occurring in any given year and is equivalent to about a 60-year flood. The U.S. Army Corps of Engineers (COE) reports that the flood of May 1948 was of approximately the same magnitude as the flood of June 8th, 1964.

Probability of Future Occurrence

The city of Stites has a very high risk of flood damage during large (40-year plus) events. The levee along the South Fork of the Clearwater River will likely protect Stites from most flood events; however, if a large event were to occur, Stites would be heavily damaged with most city and county services shut down. It is likely Highway 13 and the Luke's Gulch Road Bridge would be damaged or closed, effectively isolating residents. Nearly all of the residential and commercial structures and infrastructure would have some flood damage during a 100-year event.

Impacts of Flood Events

The potential impacts from flooding in Stites are very similar to the impacts described for Idaho County as a whole. First responders and other volunteers aiding with emergency flood control or cleanup efforts are potentially at risk of injury due to accidents or possibly exposure to contaminated water. Although unlikely, the city's water supply could be affected by contaminated flood waters entering the groundwater supply.

Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The major impacts from flooding in Stites are the restricted use of several streets, commercial, and residential areas due to overburden of existing drainage facilities. The South Fork of the Clearwater River and its tributaries run through culverts and pass under bridges through the surrounding area.

The availability of food and other supplies could be impacted or interrupted by a flood event. Furthermore, the delivery of community services such as postal services, health care, law enforcement, and emergency response may also be impacted by flood events in Stites. Individual homes and businesses may incur damages as a result of a flood and the economy of the community may be impacted by this type of hazard as well.

Environmental damages resulting from a flood event are also unlikely. The South Fork of the Clearwater River, and Cottonwood Creek occupy a relatively narrow floodplains through the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are 85 structures within the city limits of Stites that are in the flood zone. Using the average improvement value for Stites of $47,304 makes the potential loss for Stites around $4,020,840 for assessed value of structures with an additional $2,010,420 in contents.

The Stites wastewater facility is one identified critical facility located within the identified floodplain for Stites.

City of Kamiah

Flood Profile

The majority of the city of Kamiah is located at the eastern edge of Lewis County at the confluence of Lawyer Creek and the Clearwater River. The sections of the city that lie in Idaho County include residential areas on the south side of Lawyer Creek as well as homes and businesses on the east side of the Clearwater River. Most of the Kamiah's residential area and business district as well as public services are in Lewis County. A comprehensive flood assessment for the entire community is given here as the affects of a major flood event including damages would be incurred in both counties.

The drainage area of the Clearwater River encompasses approximately 4,800 square miles. The river has numerous tributaries including the Middle and South Forks of the Clearwater River, which meet at Kooskia approximately seven miles upstream of Kamiah. The area within the drainage basin consists of narrow canyons and valleys, plateaus, and steep, wooded mountain slopes. Elevations range from approximately 1,180 feet at Kamiah to nearly 9,000 feet at the headwaters of the Middle Fork of the Clearwater River. The Lawyer Creek drainage consists of a narrow canyon and rolling plateau land, ranging in elevation from approximately 1,200 feet at the mouth to over 5,000 feet at the headwaters.

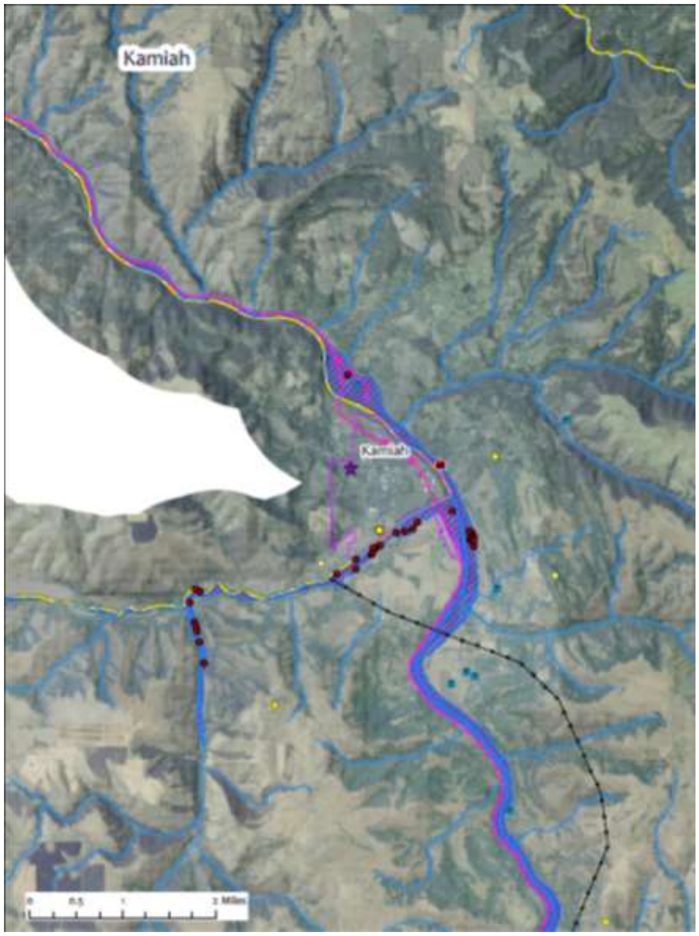
Kamiah is normally subject to spring rain runoff flooding. Occasionally rain on snow with frozen or saturated soils will cause floods during the winter months. Trash and debris may cause an increase in flood elevations by plugging culverts and bridge openings. Gravel bars may develop which will raise the channel bottom and reduce the channel flow area. Approximately 20 acres are subject to inundation by 100-year floods.

Thunderstorms are localized summer events that can also have an impact on the flooding potential of Kamiah. Although thunderstorms don't pose a significant impact of the community of Kamiah, awareness of the potential risks of thunderstorms is very valuable. Storms resulting in intense rain fall often occur rapidly and overwhelm the carrying capacity of the nearby streams. The duration of subsequent flooding tends to be a matter of hours.

The major impacts from all types of flooding in Kamiah are the restricted use of roadways and bridges. The main culverts that direct the creeks could restrict water flow, consequently backing up water onto the adjacent area. Some streets are not paved, which results in gravel washing down-slope potentially clogging sewer and storm drains. Sewer and storm drains could fill quickly, consequently backing up these lines and restricting the flow of water.

Numerous structures and businesses still operate near the floodplain, but have not been significantly influenced. .

Figure 4.7. Floodzone for Kamiah.



The primary access route into Kamiah is Highway 12. Highway 12 is the main east and west route connecting Lewiston, Idaho with Missoula, Montana. This highway is well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highway 12 through Idaho County is adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. This highway also traverses several steep draws and crosses major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions such as; 7 Mile Road, and Kamiah-NezPerce Grade. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around Kamiah to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate Kamiah vicinity due to flooding. Although road closures due to flooding are not uncommon.

During major flood events, there is also a high risk of water backing up the sewer system. Inflow exceeding the pumping capacity of the headworks could lead to a backup that would cause flooding into basements

and adjacent properties as well as standing water near transmission lines. The overall impact and damages caused by a sewer backup may be greater than the initial flood event.

Local Event History

Historically, flooding in and around Kamiah has been caused by a rain-on-snow condition or high runoff from snowmelt. The Clearwater River does relatively minor damage within the city. In the past, only the low-lying city park upstream of the U.S. Highway 12 Bridge has been inundated. Outside the city, the lumber mill on the east side of the Clearwater River was heavily flooded in 1948 and 1964.

In May 1957 and January 1965, Lawyer Creek ran rampant, tearing through levees and causing overbank damages. Levees along the creek have been damaged often by floodflows. During these two floods, residents of the area bordering the creek had their property turned into islands as the creek broke through its levees.

Another problem caused by the high, fast runoff in the Clearwater Basin during the 1948 and 1964 floods was the accumulation of river debris, especially logs. In 1964, tens of thousands of board feet of cedar lumber was washed down the Clearwater River from the Selway River drainage. This log jam was nearly three miles long. The U.S. Highway 12 bridge at Kamiah was closed to traffic while the log jam passed. In 1948, a log jam contributed to the heavy damage done to the Union Pacific railroad bridge. Major repairs were required before train traffic was allowed on the bridge.

Probability of Future Occurrence

Flood protection along Lawyer Creek has included numerous levee projects. Some of this work has been done by local agencies and individual landowners. The Army Corps of Engineers constructed levees along Lawyer Creek in the Kamiah area. However, portions of the levees have been destroyed by past flooding and only some have been rebuilt. Some levees have been constructed by private firms along the Clearwater River. Because of their instability, levees along Lawyer Creek and the Clearwater River were not included in the determination of the 100-year floodplain in Kamiah.

The city of Kamiah has a high risk of flooding by Lawyer Creek and a moderate risk from the Clearwater River. Land use and zoning policies specific to the safe and effective management of the floodplain in Kamiah would help alleviate the impact of flooding to future development. Regulation of future development in the existing floodplain may help reduce the vulnerability and potential impact to the community in the event of a flood.

Impacts of Flood Events

The potential impacts from flooding in Kamiah are very similar to the impacts described for Idaho County as a whole. First responders and other volunteers aiding with emergency flood control or cleanup efforts are potentially at risk of injury due to accidents or possibly exposure to contaminated water. Although unlikely, the city's water supply could be affected by contaminated flood waters entering the groundwater supply.

Lawyer Creek does not have a history of peaking at the same time as the Clearwater River. With its lower mean altitude of 3,500 feet, the Lawyer Creek basin generally peaks in mid to late January while the Clearwater River typically peaks in late May and early June. The stream is subject to rapid increases in flow during hard rains. Rain coupled with snowmelt has led to flooding problems in the past.

Lawyer Creek; however, is capable of causing extensive damage through a fairly large residential section of Kamiah. Rain-on-snow events in late winter have triggered the largest Lawyer Creek flows. High flows combined with the steep slope of the creek results in fast velocities, approaching fourteen feet per second in a 100-year event. Velocities in this range can cause severe erosion of the channel area, stream banks, and levees. As a result of the unpredictable erosion, overbank flooding can become concentrated. Old stream channels, some of which have been tilled, are clearly evident outside the present channel banks.

Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The availability of food and other supplies is not likely to be impacted or interrupted by a flood event. Furthermore, the delivery of community services such as postal services, health care, law enforcement, and emergency response is also not likely to be impacted by flood events in Kamiah. While individual homes and businesses may incur damages as a result of a flood, the economy of the community will not be impacted by this type of hazard.

Environmental damages resulting from a flood event are also unlikely. The South Fork of the Clearwater River, and Lawyer Creek occupy a relatively narrow floodplains through the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are no structures within the Idaho County portion of Kamiah city limits that are in the flood zone. Most of the structures that are within the 100 year floodzone occur in Lewis County. The portions of the 100-year floodplain in Idaho County consist primarily of the U.S. Highway 12 Bridge across the Clearwater

River, several secondary access route bridges on Lawyer Creek, the Blue North Timber, Inc. mill site, and a surface water collection point are within the floodplain.

There are no critical infrastructure located within the identified floodplain for Kamiah.

City of Kooskia

Flood Profile

The city of Kooskia is located at the confluence of the Middle and South Forks of the Clearwater River, and the junction of State Highway 13 and U.S. Highway 12. The Middle and South Forks comprise a drainage area of nearly 4,300 square miles. The South Fork Clearwater River is the smaller of the two drainages with an area of 1,160 square miles. The Middle Fork Clearwater River drainage is made up of the Lochsa and Selway River basins, which have their headwaters in the Bitterroot Mountains. The area within the drainage basins is made up of narrow canyons and valleys; rolling plateau land, and steep, wooded mountain slopes.

The drainage area of the Clearwater River encompasses approximately 4,800 square miles. The river has numerous tributaries including the Middle and South Forks, which meet at Kooskia. The area within the drainage basin consists of narrow canyons and valleys, plateaus, and steep, wooded mountain slopes. Elevations range from approximately 1,180 feet at Kamiah to nearly 9,000 feet at the headwaters of the Middle Fork.

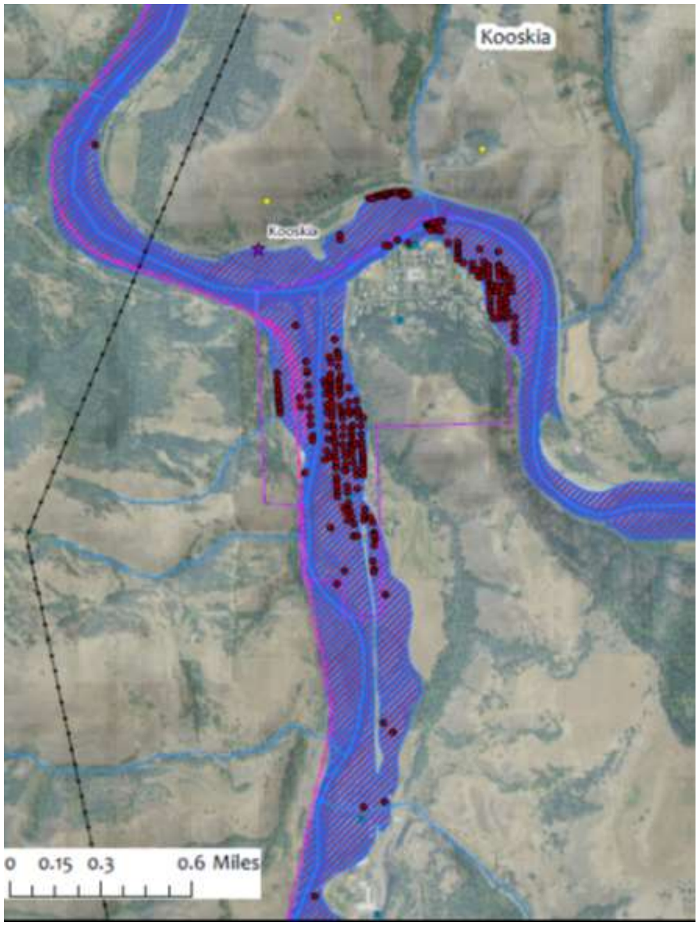
Kooskia is normally subject to spring rain runoff flooding. Occasionally rain on snow with frozen or saturated soils will cause floods during the winter months. Trash and debris may cause an increase in flood elevations by plugging culverts and bridge openings. Gravel bars may develop which will raise the channel bottom and reduce the channel flow area. Approximately 20 acres are subject to inundation by 100-year floods.

Thunderstorms are localized summer events that can also have an impact on the flooding potential of Kooskia. Although thunderstorms don't pose a significant impact to the community of Kooskia, awareness of the potential risks of thunderstorms is very valuable. Storms resulting in intense rain fall often occur rapidly and overwhelm the carrying capacity of the nearby streams. The duration of subsequent flooding tends to be a matter of hours.

The major impacts from all types of flooding in Kooskia are the restricted use of roadways and bridges. The main culverts that direct the creeks could restrict water flow, consequently backing up water onto the adjacent area. Some streets are not paved, which results in gravel washing down-slope potentially clogging sewer and storm drains. Sewer and storm drains could fill quickly, consequently backing up these lines and restricting the flow of water.

Numerous structures and businesses still operate near the floodplain, but have not been significantly influenced. .

Figure 4.8. Floodzone for Kooskia.



The primary access routes into Kooskia are Highways 12 and 13. Highway 12 is the main east and west route connecting Lewiston, Idaho with Missoula, Montana. These highways are well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highways 12 and 13 through Idaho County are adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. These highways also traverses several steep draws and crosses major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions such as; Kidder Ridge Road, Clear Creek Road, Winona Grade Road, and N River Drive. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around Kooskia to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate Kooskia vicinity due to flooding. Although road closures due to flooding are not uncommon.

During major flood events, there is also a high risk of water backing up the sewer system. Inflow exceeding the pumping capacity of the headworks could lead to a backup that would cause flooding into basements

and adjacent properties as well as standing water near transmission lines. The overall impact and damages caused by a sewer backup may be greater than the initial flood event.

Local Event History

The two largest floods to hit Kooskia were in 1964 and 1948. In these two years, the Middle and South Forks peaked with major flood flows at nearly the same time. The Middle Fork peaked with 78,500 cfs and 83,500 cfs in 1948 and 1964 respectively. The two rivers peaked closest together in the 1964 flood, thereby causing a larger peak on the main stem of the Clearwater River downstream of the confluence. The peak discharge on the South Fork equaled that of a 50-year flood, while the 83,500 cfs recorded on the Middle Fork in 1964 was slightly less than that of a 50-year flood.

In 1964, 3.5 inches of rain fell in a 50 hour period to compound the high snowmelt runoff. In both 1964 and 1948, the eastern part of the city on the Middle Fork as well as the business district along the South Fork was flooded; however, most of the damage was from shallow flooding. During the 1964 flood, water seeped through a large area of the dike along the South Fork and sandbagging had to be done on the dike near the airport. Several residents of eastern Kooskia were evacuated during both events.

Another problem caused by the high, fast runoff in 1964 and in 1948 was log jamming. In both years, but especially in 1964, tens of thousands of board feet of cedar lumber was washed down the Middle Fork Clearwater River from the Selway River drainage. This jam measured nearly three miles long during the 1964 flood and raised havoc at every bridge the jam passed. Due to the stress and potential damage, many bridges crossing the Middle Fork were closed to traffic.

A Presidential Disaster was declared in 2010 for flooding near Kooskia. Small stream, flash floods took out roads and culverts east and south-east of Kooskia (Clear Creek; Leitch Creek) which caused over 30 infrastructure project repairs ultimately funded by FEMA.

Probability of Future Occurrence

Many dikes and levees have been constructed along both the Middle and South Forks of the Clearwater River in the Kooskia vicinity. A levee on the west bank of the South Fork extends from the mouth upstream to a point across the river from Third Avenue. The levee on the east bank begins approximately 1,000 feet downstream of B Street and extends upstream to approximately 350 feet above First Avenue. The levee begins again at the upstream end of the sewage lagoons, near Kooskia Airport, and extends upstream to approximately 5,000 feet past the southern city limits. South of the city, there are levees in various places along both sides of the South Fork Clearwater River. In February of 1948, the COE performed clearing and snagging work along the South Fork levee for 2,000 feet in anticipation of the spring runoff that year. In 1949, the COE made emergency repairs to 3,000 feet of the same levee above River Mile 1.0. These repairs were required due to the flood of 1948. After the 1964 flood, local crews constructed a dike along the south side of the Middle Fork. This dike extends from the intersection of Dike Street and U.S. Highway 12, downstream 2,000 feet to a point upstream of the sewage lagoons. The dike along the Middle Fork has been tested twice with large flows in 1972 and 1974. Although flows in these years were not as large as the 1964 flood, they were close, coming within 2,000 cfs.

Nearly all of Kooskia on both sides of the South Fork of the Clearwater River and a significant portion of the city along the south side of the Middle Fork, particularly on the eastern edge, have a high risk of flooding. This includes large sections of residential areas as well as much of the Main Street business district. City Hall, the fire department, the airport, the wastewater treatment facility, and three municipal well heads are included in this floodplain. Just south of the city limits, the floodplain also includes the Clearwater Forest Industries mill and a portion of the parcel containing Clearwater Valley High School. Furthermore, a section of State Route 13 through downtown Kooskia and a section U.S. Highway 12 on the north side of the Middle Fork are within the floodplain and could potentially be damaged or closed. The State Route 13 bridge crossing on the Middle Fork and a smaller access bridge about ½ mile upstream are also in the floodplain; however, both of these bridges were built to withstand major flood event.

The city of Kooskia has a very high risk of flooding from both the Middle and South Forks of the Clearwater River. The levees currently built along the river banks will likely protect the city from most flood events; however, most of these levees were built over 50 years ago and may not hold during a large event.

Impacts of Flood Events

The potential impacts from flooding in Kooskia are very similar to the impacts described for Idaho County as a whole. First responders and other volunteers aiding with emergency flood control or cleanup efforts are potentially at risk of injury due to accidents or possibly exposure to contaminated water. Although unlikely, the city's water supply could be affected by contaminated flood waters entering the groundwater supply.

Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The availability of food and other supplies is not likely to be impacted or interrupted by a flood event. Furthermore, the delivery of community services such as postal services, health care, law enforcement, and emergency response is also not likely to be impacted by flood events in Kooskia. While individual homes and businesses may incur damages as a result of a flood, the economy of the community will not be impacted by this type of hazard.

Environmental damages resulting from a flood event are also unlikely. The South Fork and Middle Fork of the Clearwater River occupy a relatively narrow floodplain through the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are 233 structures within the city limits of Kooskia that are in the flood zone. Using the average improvement value for Kooskia of $59,311 makes the potential loss for Kooskia around $13,819,463 for assessed value of structures with an additional $6,909,732 in contents.

There are no critical infrastructure located within the identified floodplain for Kamiah.

City of White Bird

Flood Profile

The city of White Bird is located along White Bird Creek approximately one mile upstream from its confluence with the Salmon River. The town lies on a narrow strip of land between the base of the slope and river. The Salmon River flows along Highway 95 to the west of White Bird and White Bird Creek passes throught the city of White Bird and under Highway 95 before it ties in with the Salmon River.

White Bird is normally subject to spring rain runoff flooding. Occasionally rain on snow with frozen or saturated soils will cause floods during the winter months. Trash and debris may cause an increase in flood elevations by plugging culverts and bridge openings. Gravel bars may develop which will raise the channel bottom and reduce the channel flow area. Approximately 20 acres are subject to inundation by 100-year floods.

Thunderstorms are localized summer events that can also have an impact on the flooding potential of Riggins. Although thunderstorms don't pose a significant impact to the community of White Bird, awareness of the potential risks of thunderstorms is very valuable. Storms resulting in intense rain fall often occur rapidly and overwhelm the carrying capacity of the nearby streams. The duration of subsequent flooding tends to be a matter of hours.

The major impact from flooding in White Bird is the inundation of water into several residential areas and a small section of the town's commercial district on the east side of Old Highway 95. The White Bird Creek bridge crossing on the U.S. Highway 95 connection road is also within the floodplain and could become damaged or plugged during a flood event with significant consequences to downtown White Bird. A levee, built by the Corps of Engineers, helps protect the community from White Bird Creek flood events. The levee is the responsibility of Flood District #6 and is in reasonably good condition; however, there are some encroachment and development issues. Several structures and businesses still operate near the floodplain, but have not been significantly influenced.

Figure 4.9. Floodzone for White Bird.

The old U.S. Highway 95 passes directly through the White Bird community center. The reroute of Highway 95 bypasses the town site to the west via a large bridge across the White Bird Creek drainage. The primary access into the community center is a short spur road off the new U.S. 95 that connects to the old highway. Highway 95 is the main route connecting north and south Idaho. This highway is well traveled by not only area commuters, but also intra and inter-state travelers. Most of Highway 95 through Idaho County is adjacent to moderate to steep sloped forestland and rangeland, and agricultural fields. This highway also traverses several steep draws and crosses several major creeks and rivers within the county.

There are several other good access routes that extend from the community in all directions. Some are two-lane paved roads, while others are typically one lane gravel roads; however, they are wide and stable enough to support some large truck travel. All of these potential access routes dip in and out of small drainages and cross small streams that may prove impassable in major flood events. There is enough elevational relief around White Bird to provide a place for people to go until flood waters recede. There would be no need to evacuate the entire community during a flood event. Historically, there has been little damage to roadways in the immediate White Bird vicinity due to flooding. Although road closures due to flooding are not uncommon.

During major flood events, there is also a high risk of water backing up the sewer system. Inflow exceeding the pumping capacity of the headworks could lead to a backup that would cause flooding into basements and adjacent properties as well as standing water near transmission lines. The overall impact and damages caused by a sewer backup may be greater than the initial flood event.

Local Event History

Heavy rains and spring runoff have caused several flood events in White Bird. There have been no recent major flood events however.

Probability of Future Occurrence

A section of recreational, residential, and commercial property is also within the 100-year floodplain along the Salmon River near the confluence of White Bird Creek including the main bridge crossing at Deer Creek.

Impacts of Flood Events

The potential impacts from flooding in White Bird are very similar to the impacts described for Idaho County as a whole. First responders and other volunteers aiding with emergency flood control or cleanup efforts are potentially at risk of injury due to accidents or possibly exposure to contaminated water. Although unlikely, the city's water supply could be affected by contaminated flood waters entering the groundwater supply.

Shallow flooding occurs when culvert capacities are inadequate and unconfined flow overtops the channel banks. Once out of channel, the water scatters in undefined low areas. The limits of flooding and depth will be different for each flood as they are dependent upon the variable nature of the debris carried by the flood, the brush along the channel, the location of parked cars, and other conditions that depend on the time of the year (i.e. ice and snow accumulations).

The city of White Bird has a moderate risk of flood damage due to the levee along White Bird Creek. Properties in the floodplain along the Salmon River also have a moderate risk of damage due to flooding.

Flooding of any public facilities will impact residents of White Bird as commerce is disrupted and distribution of basic services such as emergency response and postal services are slowed. Electrical service may also be impacted as power is shut off in flooded areas to prevent electric shock. The lack of electricity could become a secondary hazard as the ability of residents to cook or provide heat is halted. Additionally, grocery and petroleum outlets may be closed or contaminated, which may lead to a lack of fresh drinking water and food sources as well as residents' inability to leave the area. Any amount of flooding typically causes damage to structures. Much of the damage may be cosmetic, but still very costly. More extreme damage may be caused as river and stream channels migrate or infrastructural components, such as bridges or municipal wells, are destroyed.

Environmental damages resulting from a flood event are also unlikely. Salmon River and White Bird Creek occupy a relatively narrow floodplain through the community. Scouring and erosion along the banks of the stream is possible, however, due to grass and other vegetation, these impacts will most likely be minimal and localized. Contamination of the riparian area by floodwaters containing chemicals or other pollutants is a possibility, but this type of event is more likely to be realized in the surrounding areas than within the community due to the hydrologic profile of the floodplain.

The impacts of a sewer backup caused by flooding would be more widespread than the property and infrastructure damages caused by this type of event. The combined flow of stormwater and sanitary sewer would create a significant public health concern. Not only could potable water sources be contaminated, but standing water often attracts insects. Additionally, there could be environmental concerns including wildlife habitat damage and long term soil impacts in flooded areas due to contaminants in the floodwaters.

Value of Resources at Risk

There are 6 structures within the city limits of White Bird that are in the flood zone. Using the average improvement value for White Bird of $57,269 makes the potential loss for White Bird around $343,614 for assessed value of structures with an additional $171,807 in contents.

The main bridge crossing at Deer Creek is located within the identified floodplain for White Bird, as well as the wastewater facility.

Chapter 5

Earthquake Hazard Profile

IN THIS SECTION:

- Regional and Local Hazard Profile
- Jurisdictional Risk and Vulnerability Assessment
- Individual Community Assessments

Chapter 5 Hazard Risk Assessment

This Page Intentionally Left Blank

Chapter 5 – Earthquake

Regional and Local Hazard Profile

An earthquake is trembling of the ground resulting from the sudden shifting of continental plates beneath the earth's crust. Earthquakes may cause landslides and rupture dams. Severe earthquakes destroy power and telephone lines and gas, sewer, or water mains, which, in turn, may set off fires and/or hinder firefighting or rescue efforts. Earthquakes also may cause buildings, bridges, and other infrastructure to collapse.

Idaho experiences numerous minor earthquakes annually. Hebgen Lake and Borah Peak were two of the largest earthquakes in the continental United States (7.3 and 6.9 magnitude, respectively). They may affect large areas, cause great damage to structures, cause injury or loss of life, and alter the socioeconomic functioning of the communities involved. The hazard risk of earthquakes varies from place to place depending upon the regional and local geology.

Earthquakes occur along faults, which are fractures or fracture zones in the earth across which there may be relative motion. If the rocks across a fault are forced to slide past one another, they do so in a *stick-slip* fashion; that is, they accumulate strain energy for centuries or millennia, then release it almost instantaneously. The energy released radiates outward from the source, or focus, as a series of waves - an earthquake. The primary hazards of earthquakes are ground breaking, as the rocks slide past one another, and ground shaking, by seismic waves. Secondary earthquake hazards result from distortion of surface materials such as water, soil, or structures.

Ground shaking may affect areas 65 miles or more from the epicenter (the point on the ground surface above the focus). As such, it is the greatest primary earthquake hazard. Ground shaking may cause seiche, the rhythmic sloshing of water in lakes or bays. It may also trigger the failure of snow (avalanche) or earth materials (landslide). Ground shaking can change the mechanical properties of some fine grained, saturated soils, whereupon they liquefy and act as a fluid (liquefaction). The dramatic reduction in bearing strength of such soils can cause buried utilities to rupture and otherwise undamaged buildings to collapse.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, or trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.

The earth's crust breaks along uneven lines called faults. Geologists locate these faults and determine which are active and inactive. This helps identify where the greatest earthquake potential exists. Many faults mapped by geologists are inactive and have little earthquake potential; others are active and have a higher earthquake potential.

Aftershocks are smaller earthquakes that follow the main incident and can cause further damage to weakened buildings. Aftershocks can occur in the first hours, days, weeks, or even months after the quake. Some earthquakes are actually foreshocks with a larger earthquake eminent.

Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking.[20]

Earth scientists believe that most earthquakes are caused by slow movements inside the Earth that push against the Earth's brittle, relatively thin outer layer, causing the rocks to break suddenly. This outer layer is fragmented into a number of pieces, called plates. Most earthquakes occur at the boundaries of these plates. Idaho is part of an earthquake province called the Basin and Range Province. The Basin and Range Province is characterized by a series of northeast-southwest trending mountain ranges, which have been uplifted along normal faults and associated fault zones.[21] The Intermountain Seismic Belt connects the Basin and Range Province with the more stable parts of North America (Idaho). The majority of Idaho's earthquakes occur along the Intermountain Seismic Belt, which runs from northwestern Montana, along the border of Idaho and Wyoming, and into Utah and Nevada. A significant branch of the Intermountain Seismic Belt extends west from the Yellowstone Hotspot, called the Yellowstone Tectonic Parabola, which is a result of the Basin and Range Province and the Yellowstone Hotspot uniquely interacting together. There are at least 8 major active faults in the Yellowstone Tectonic Parabola that account for numerous earthquake swarms and the location of Hebgen Lake and Borah Peak earthquakes.[22]

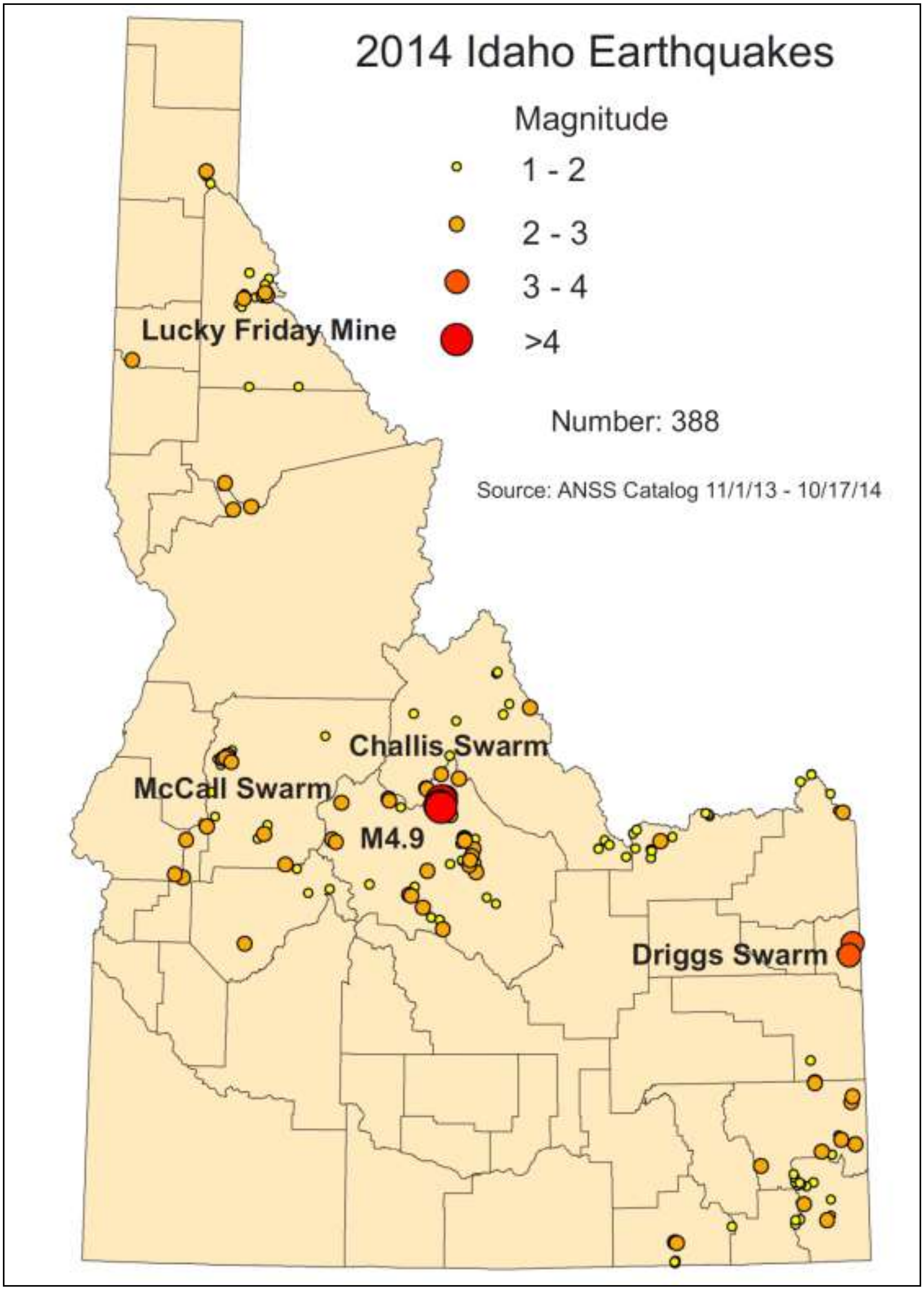
---

[20] FEMA. Federal Emergency Management Agency. Available online at www.fema.gov. September 2007.

[21] Digital Geology of Idaho. April 2011. Digital Atlas of Idaho. Available online at http://geology.isu.edu/Digital_Geology_Idaho/.

[22] Idaho Bureau of Homeland Security. April 2011. Available online at www.bhs.idaho.gov.

Figure 5.1. Idaho Seismic Activity Map for 2014.



According to the handbook "Putting Down Roots in Earthquake Country", published by the Idaho Geological Survey[23], the mountainous regions of eastern and central Idaho, both north and south of the Snake River, are at the most risk for large damaging earthquakes. However, moderate earthquakes can occur anywhere in Idaho and could cause significant damage to un-reinforced infrastructure and even fatalities. Currently, many of Idaho's counties have building codes in place for new construction that help structures mitigate the effects of shaking. Older public buildings, especially unreinforced masonry, within Idaho County could be at risk to shaking hazards and may need to be retrofitted for seismic stability.

The International Building Code (IBC), a nationwide industry standard, sets construction standards for different seismic zones in the nation. IBC seismic zone rankings for Idaho are among the highest in the nation. When structures are built to these standards they have a better chance to withstand earthquakes.

Structures that are in compliance with the 1970 Uniform Building Codes (UBC), which are now replaced by the International Building Code, are generally less vulnerable to seismic damages due to the inclusion of seismic construction standards.

Future injuries and property losses from earthquake hazards can be reduced by considering these hazards when making decisions about land use, by designing structures that can undergo ground shaking without collapse, by securely attaching the non-structural elements of a building, and by educating the public about what to do before, during, and after an earthquake to protect life and property.[24]

Second-Order Hazard Events

Earthquake events can result in other types of hazard incidents. In a disaster event, the first hazard event may not be the primary cause of damages or losses within the community. Historical earthquake events have often resulted in structural fires due to broken gas lines, candles, electrical malfunctions, etc. The following chart outlines the interconnection between earthquake hazards and other types of hazard events.

---

[23] IGS. April 2011. Idaho Geologic Survey. "Putting Down Roots in Earthquake Country – Your Handbook for Earthquakes in Idaho." Available online at http://www.idahogeology.org/uploads/Putting_Down_Roots_3_19_11.pdf.

[24] Noson, Linda Lawrance, et al. Washington State Earthquake Hazards. Washington Division of Geology and Earth Resources Information Circular 85. Olympia, Washington. 1988.

Table 5.1. Second-Order Hazards Related to Earthquake Events.	
Related Causal Events	**Related Effects**
None	Dam Failure
	Structural/Urban Fire
	Wildland Fire
	Transportation System
	Hazardous Materials
	Landslide
	Power Outage
	Seiche
	Volcano

Jurisdictional Risk and Vulnerability Assessment

Idaho County Annex

Earthquake Profile

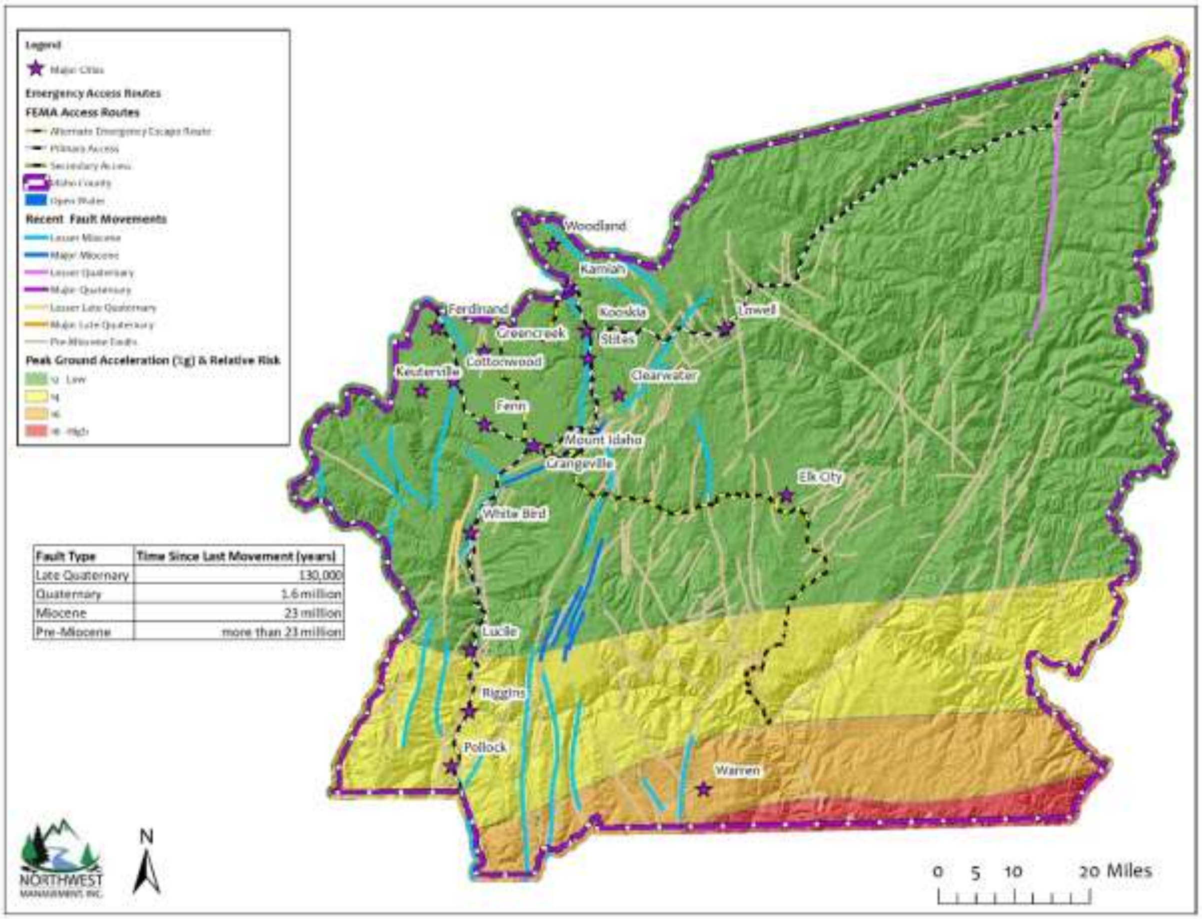
Based on historical records, Idaho County has not experienced any seriously damaging earthquakes in recorded history. Several distant earthquakes produced intensities strong enough to be felt in southern Idaho, but no earthquake epicenters were recorded for the region.[25] Many of Idaho's cities are at risk to earthquakes, even small ones, because many were built on unconsolidated sediments that move easily in response to seismic waves. Seismic waves are the form of energy that ripples through Earth when an earthquake occurs. When seismic waves propagate through unconsolidated sediments the sediments re-organize and move chaotically (analogy to shaking like a bowl of gelatin). The danger is really two fold because those cities, which were built near rivers below the foothills and mountains, eventually expanded upward into the foothills. Mountain foothills contain erosion remnants called alluvial fans. The alluvial fans may either slide down into the valley or simply shake about creating new topography due to internal settling. For this reason, Idaho ranks fifth in the lower 48 states as to its earthquake hazard.

The U.S. Geological Survey has gathered data and produced maps of the nation, depicting earthquake-shaking hazards. This information is essential for creating and updating seismic design provisions of building codes in the United States. The USGS Shaking Hazard maps for the United States are based on current information about the rate at which earthquakes occur in different areas and on how far strong shaking extends from quake sources. Studies of ground shaking in Idaho during previous earthquakes have led to better interpretations of the seismic threat to buildings. In areas of severe seismic shaking hazard, older buildings are especially vulnerable to damage. Older buildings are at risk even if their foundations are on solid bedrock. Areas shown on the map with high seismic shaking hazard can experience earthquakes with high intensity where weaker soils exist. Most populated areas in Idaho are

[25] Idaho Geological Society. 2004. Available online at http://www.idahogeology.com/Services/GeologicHazards/Earthquakes/.

located on or near alluvial deposits that provide poorer building site conditions during earthquakes. Older buildings may suffer damage even in areas of moderate ground shaking hazards.[26]

Figure 5.2. Seismic Shaking Hazard for Idaho County



Local Event History

No history of earthquake events has been specifically recorded for Idaho County.

Probability of Future Occurrence

There are several known geologic faults throughout Idaho County most with a north to south orientation. Peak ground acceleration (pga), in percent g, is a measure of the ground motion, which decreases, the further you are from the earthquake. The USGS Shaking Hazard maps for the United States are based on current information about the rate at which earthquakes occur in different areas and on how far strong shaking extends from quake sources. Colors on the map in Figure 5.3 show the levels of horizontal shaking

[26] Idaho Geological Society. 2004. Available online at http://www.idahogeology.com/Services/GeologicHazards/Earthquakes/.

that have a 1 in 10 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of "g" (g is the acceleration of a falling object due to gravity). This map is based on seismic activity and fault-slip rates and takes into account the frequency of occurrence of earthquakes of various magnitudes. Locally, this hazard may be greater than that shown, because site geology may amplify ground motions. As seen in Figure 5.3, the earthquake probability in the northern portion of the county has a 10% chance of exceeding a 12% pga followed by a 10% chance of exceeding a 14% pga, then 16% pga, and finally 18% pga as you get move south through the County over the next 50 years.[27] No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard. Although as a general statement, communities in northern Idaho County such as Kooskia, Grangeville, and Cottonwood have a lower risk of experiencing seismic shaking than communities in the Salmon River Valley.

Table 5.2. Earthquake Probability in Idaho County.[28]

	Probablility in 50 years	
Magnitude	*Grangeville*	*Riggins*
5	7.81	11.6
5.1	6.55	9.76
5.2	5.5	8.21
5.3	4.61	6.89
5.4	3.86	5.79
5.5	3.24	4.86
6	1.36	2.03

Impacts of Earthquake Events

Past events suggest that an earthquake in the Idaho County area would cause little to no damage. Nonetheless, severity can increase in areas that have softer soils, such as unconsolidated sediments.

Although unlikely in Idaho County, buildings that collapse as a result of an earthquake can trap and bury people, putting lives at risk, and creating clean-up costs. Upgrading existing buildings to resist earthquake forces is more expensive than meeting code requirements for new construction; thus, a high number of structures in Idaho County, particularly those built prior to seismic code requirements, remain at risk.

Communities in Idaho County can expect some structural failure of older multistory unreinforced masonry buildings as a result of even low intensity earthquakes. Cornices, frieze, and other heavy decorative portions of structures may fail. The potential impacts of a substantial earthquake event are highly variable. Many of the structures and infrastructure throughout the county may not incur any damages at all; however, damage to roads, bridges, unreinforced masonry, chimneys, foundations, water lines, sewer

---

[27] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

[28] http://www.homefacts.com/earthquakes/Idaho.html. Accessed August, 2012.

lines, natural gas pipelines, and many other components are at risk. Fires can also be a secondary hazard to structures sustaining earthquake damage. The economic losses to businesses in the area may be very high as owners are forced to stop production or close their doors for even just a day.

Because structural damage by earthquakes is typically not complete destruction, but rather tends to be subtle cracking or settling that undermines the stability of the structure. These types of repairs can be very costly. Additionally, changes to the water table or even the topography can significantly impact local municipal and private wells and could result in the loss of traditional land uses.

Value of Resources at Risk

HAZUS®-MH[29] is a regional earthquake loss estimation model that was developed by FEMA and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake loss estimations at a regional scale. In order to estimate potential earthquake losses in Idaho County, HAZUS was used to model a 2015 scenario based on the parameters of the nearest historic epicenter. The modeled earthquake re-created the effects of a 6.93 magnitude earthquake at a depth of 10 kilometers, i.e. the most likely type of earthquake event to occur in Idaho County. The HAZUS model estimated direct earthquake damages, induced earthquake damage, social impacts, and economic losses. It should be noted that the figures have a high degree of uncertainty and should only be used for general planning purposes. This model is also highly dependent on how much information the county has provided to the database.

For the modeled earthquake scenario, the HAZUS software reported no expected damage to essential facilities including hospitals, schools, emergency operations centers, police stations, and fire stations. There are an estimated 8,000 buildings in Idaho County with a total building replacement value (excluding contents) of $1,571.0 million. The software also reported that 0 structures would be damaged even slightly. No commercial buildings are expected to incur damages.

The replacement value of the transportation and utility lifeline systems is estimated to be $2,687.5 million and $562.2 million, respectively. HAZUS estimated that no damages to the transportation system, potable water and electric power system, or the utility system facilities would be expected. The HAZUS model also does not project any casualties or sheltering as a result of the earthquake scenario.

[29] FEMA. Hazuz®-MH. Department of Homeland Security. Federal Emergency Management Agency, Mitigation Division. Washington, D.C. November 2010.

Table 5.3. Summary of Utility System Damage from HAZUS.

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	8	0	0	8	8
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	3	0	0	3	3

HAZUS estimated the long-term economic impacts for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within Idaho County. HAZUS estimated that there would be zero economic losses attributed to an earthquake of this magnitude.

HAZUS estimated that there are 79 unreinforced masonry structures in all of Idaho County. There are no known publically accessible unreinforced masonry structures in unincorporated Idaho County.

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Individual Community Assessments

City of Grangeville

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of Grangeville; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. Grangeville does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 12% pga in the next 50 years.[30]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. There are several publicly accessible unreinforced masonry structures in Grangeville in addition to the numerous homes and other buildings throughout the City with unreinforced chimneys. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Value of Resources at Risk

A visual assessment of the community's public and commercial structures concludes that approximately one-third of the businesses on Main Street are likely unreinforced brick construction including several with common walls. However, most of the governmental offices and schools with masonry construction or ornamentation are reinforced including city hall, the fire station, the courthouse, post office, elementary and junior high school, high school, and public works building. It is probable that most of the new construction and renovation projects that have occurred in downtown Grangeville have been built to seismic safety standards. These structures were built prior to the inclusion of articles for seismic stability in the Uniform Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in Grangeville is unknown, but estimated to include at least 50 buildings.

City of Ferdinand

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of Ferdinand; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. Ferdinand does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 12% pga in the next 50 years.[31]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. There are no known publicly accessible unreinforced masonry structures in

[30] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

[31] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

Ferdinand, however there are potentially numerous homes and other buildings throughout the City with unreinforced chimneys. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Value of Resources at Risk

In Ferdinand, there are no known unreinforced masonry buildings within the city limits. Unreinforced masonry structures were typically built prior to the inclusion of articles for seismic stability in the Uniform Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in Ferdinand is unknown, but estimated to include at least 10 buildings.

City of Cottonwood

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of Cottonwood; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. Cottonwood does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 12% pga in the next 50 years.[32]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. There are several publicly accessible unreinforced masonry structures in Cottonwood in addition to the numerous homes and other buildings throughout the City with unreinforced chimneys. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Value of Resources at Risk

A visual assessment of the community's public and commercial structures concludes that approximately twenty-six businesses on Main Street are likely unreinforced brick construction, several with common walls. Additionally, two public schools, the post office, and three banks are potentially unreinforced brick or cinder block structures. The city hall as well as the community center also appears to be unreinforced masonry. These structures were built prior to the inclusion of articles for seismic stability in the Uniform

---

[32] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in Cottonwood is unknown, but estimated to include at least 50 buildings.

City of Riggins

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of Riggins; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. Riggins does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 14% pga in the next 50 years.[33]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. There are several publicly accessible unreinforced masonry structures in Riggins in addition to the numerous homes and other buildings throughout the City with unreinforced chimneys. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Value of Resources at Risk

A visual assessment of the community's public and commercial structures concludes that approximately nineteen businesses or organizations on Main Street are likely unreinforced block or brick. At least ten of the downtown commercial businesses were built using block construction prior to 1975 including the grocery store, a motel, and two gas stations. Furthermore, the high school, the IOOF hall, two churches, and the elementary school were constructed either entirely or partially with block construction techniques. These structures were built prior to the inclusion of articles for seismic stability in the Uniform Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in Riggins is unknown, but estimated to include at least 15 buildings.

City of Stites

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of Stites; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. Stites does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole.

---

[33] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 12% pga in the next 50 years.[34]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. There are a few publicly accessible unreinforced masonry structures in Stites in addition to the numerous homes and other buildings throughout the City with unreinforced chimneys. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Value of Resources at Risk

Based on a visual estimate of the downtown area, the post office, city hall/fire station, and the hardware store are likely unreinforced masonry structures. These structures were built prior to the inclusion of articles for seismic stability in the Uniform Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in Stites is unknown, but estimated to include at least 10 buildings.

City of Kamiah

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of Kamiah; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. Kamiah does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 12% pga in the next 50 years.[35]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. There are no know publicly accessible unreinforced masonry structures in Kamiah, however there are likely numerous homes and other buildings throughout the City with unreinforced chimneys. The Community Building in town has been seismically evaluated due to suspicious

---

[34] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

[35] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

cracks in the foundation in similar areas on both sides of the building. It was determined that these cracks were likely caused by the structure's proximity to the fault line.

Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Value of Resources at Risk

In Kamiah, the American Legion hall, the Presbyterian Church, the airport facility, the schools, the water treatment plant, and approximately 25 additional structures in the downtown district are assumed to be unreinforced masonry. The value of these structures is unknown. These structures were built prior to the inclusion of articles for seismic stability in the Uniform Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in Kamiah is unknown, but estimated to include at least 125 buildings.

City of Kooskia

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of Kooskia; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. Kooskia does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 12% pga in the next 50 years.[36]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. Most of the commercial and public structures in Kooskia were built using wood construction materials; however, there are several cinderblock and/or red brick buildings as well. City hall was built using cinderblocks; however, it is not known if the structure is reinforced. There are approximately 5 commercial buildings that are likely unreinforced masonry structures in Kooskia in addition to the numerous homes and other buildings throughout the City with unreinforced chimneys. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

[36] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

Value of Resources at Risk

In Kooskia, there are at least 5 unreinforced masonry buildings within the city limits. Unreinforced masonry structures were typically built prior to the inclusion of articles for seismic stability in the Uniform Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in Kooskia is unknown, but estimated to include at least 25 buildings.

City of White Bird

Earthquake Profile

There are no recorded occurrences of earthquakes significantly impacting the city of White Bird; however, some minimal shaking has been felt as a result of larger earthquakes elsewhere. White Bird does not have any differing issues or levels of risk associated with this hazard than Idaho County as a whole. The city of White Bird sits at the bottom of a canyon; thus, landslides resulting from earthquakes are a great concern. Also, ingress and egress from the city could be complicated by slides or road damage on U.S. Highway 95 or Old Highway 95. The White Bird Grade has considerable slide potential and the Highway 95 bridge spanning White Bird Creek is directly above much of the residential portion of the city of White Bird.

Probability of Future Occurrence

The City has a 10% chance of exceeding a 12% pga in the next 50 years.[37]

Impacts of Earthquake Events

Unreinforced masonry (URM) structures and unreinforced chimneys of homes will likely be damaged in the event of an earthquake. Most of the commercial and public structures in White Bird were built using wood construction materials; however, there are several cinderblock and/or unreinforced masonry buildings as well. The school and post office are potentially unreinforced brick and cinder block, in addition to the numerous homes and other buildings throughout the City with unreinforced chimneys that would be at high risk during an earthquake. Damaged or collapsed chimneys could result in the secondary hazard of fire. Nonstructural damage caused by falling and swinging objects may be considerable after any magnitude earthquake. Damage to some older, more fragile bridges and land failure causing minor slides along roadways may isolate some residents.

Value of Resources at Risk

In White Bird, there are at least 2 unreinforced masonry buildings within the city limits. Unreinforced masonry structures were typically built prior to the inclusion of articles for seismic stability in the Uniform Building Codes in 1972. The number and value of unreinforced masonry homes or homes with masonry chimneys in White Bird is unknown, but estimated to include at least 10 buildings.

[37] USGS. 2008 United States National Seismic Hazard Maps. U.S. Geological Survey. U.S. Department of Interior. Available online at http://earthquake.usgs.gov/hazards/products/conterminous/2008/. October 2009.

Chapter 6

Landslide Hazard Profile

IN THIS SECTION:

- Regional and Local Hazard Profile
- Jurisdictional Risk and Vulnerability Assessment
- Individual Community Assessments

Chapter 6
Hazard Risk
Assessment

This Page Intentionally Left Blank

Chapter 6 – Landslide

Regional and Local Hazard Profiles

Landslide is a general term for a wide variety of down slope movements of earth materials that result in the perceptible downward and outward movement of soil, rock, and vegetation under the influence of gravity. The materials may move by falling, toppling, sliding, spreading, or flowing. Some landslides are rapid, occurring in seconds, whereas others may take hours, weeks, or even longer to develop. Although landslides usually occur on steep slopes, they also can occur in areas of low relief.[38]

Landslides can occur naturally or be triggered by human-related activities. Naturally-occurring landslides can occur on any terrain, given the right condition of soil, moisture content, and the slope's angle. They are caused from an inherent weakness or instability in the rock or soil combined with one or more triggering events, such as heavy rain, rapid snow melt, flooding, earthquakes, vibrations, and other natural causes. Other natural triggers include the removal of lateral support through the erosive power of streams, glaciers, waves, and longshore and tidal currents; through weathering, wetting, drying, and freeze-thaw cycles in surficial materials; or through land subsidence or faulting that creates new slopes. Long-term climate change can influence landslide occurrences through increased precipitation, ground saturation, and a rise in groundwater level, which reduces the strength and increases the weight of the soil.

Landslides can also be induced, accelerated or retarded by human actions. Human-related causes of landslides can include grading, slope cutting and filling, quarrying, removal of retaining walls, lowering of reservoirs, vibrations from explosions, machinery, road and air traffic, and excessive development. Normally stable slopes can fail if disturbed by development activities. Often, a slope can also become unstable by earthmoving, landscaping, or vegetation clearing activities. Changing drainage patterns, groundwater level, or slope and surface water through agricultural or landscape irrigation, roof downspouts, septic-tank effluent, or broken water or sewer lines can also generate landslides. Due to the geophysical or human factors that can induce a landslide event, they can occur in developed areas, undeveloped areas, or any areas where the terrain was altered for roads, houses, utilities, buildings, and even for lawns.[39]

There are hundreds of landslides that occur in Idaho annually. The frequency of landslides, particularly cut and fill slopes along roads, is due to the geology, vegetation, climate, soils, and other human factors. There are, on occasion, severe landslide events that occur in Idaho. There have been two federally declared disasters and four state disasters since 1990.[40] Since 1976, major events have had a significant impact on transportation, communities, and natural resources in 1982, 1986 (x2), 1991, 1996-97, 1997, 1998 (x2), and 2000.

Landslides range from shallow debris flows to deep-seated slumps. They destroy homes, businesses and public buildings, undermine bridges, derail railroad cars, interrupt transportation infrastructure, damage utilities, and take lives. Sinkholes affect roads and utilities. Losses often go unrecorded because insurance

[38] "Landslides". SAARC Disaster Management Center. New Delhi. Available online at http://saarc-sdmc.nic.in/pdf/landslide.pdf. Accessed March 2011.

[39] Tetra Tech. DMA 2000 Hazard Mitigation Plan. Onondaga County, New York. April 2010.

[40] Idaho Bureau of Homeland Security. April 2011. Available online at www.bhs.idaho.gov.

claims are not filed, no report is made to emergency management, there is no media coverage, or the transportation damages are recorded as regular maintenance.

Table 6.1. Landslide Disaster Declarations in 1976-2000.

Year	Month	Federal	Counties Affected
1982	July		Boise
1986	February		Boise
1986	March		Boise, Elmore, Lewis, Nez Perce, Owyhee
1991	April		Bonner
1996-1997	November-January	X	Adams, Benewah, Boise, Bonner, Boundary, Clearwater, Elmore, Gem, Idaho, Kootenai, Latah, Nez Perce, Owyhee, Payette, Shoshone, Valley, Washington
1997	March-June	X	Benewah, Bonner, Boudary, Kootenai, Shoshone
1998	May		Lemhi, Nez Perce, Washington
	October		Boundary
2000	June		Kootenai
2010	April		Bonner, Idaho, Shoshone
2011	April-May	X	Bonner, Boundary, Clearwater, Idaho, Nez Perce, Shoshone and Nez Perce Tribe

Land stability cannot be absolutely predicted with current technology. The best design and construction measures are still vulnerable to slope failure. The amount of protection, usually correlated to cost, is proportional to the level of risk reduction. Debris and vegetation management is integral to prevent landslide damages. Corrective measures help, but can often leave the property vulnerable to some level of risk.

The following is a list of characteristics that may be indicative of a landside hazard area:

- Bluff retreat caused by sloughing of bluff sediments, resulting in a vertical bluff face with little vegetation.
- Pre-existing landside area.
- Tension or ground cracks along or near the edge of the top of a bluff.
- Structural damage caused by settling and cracking of building foundations and separation of steps from the main structure.
- Toppling bowed or jack sawed trees.
- Gullying and surface erosion.
- Mid-slope ground water seepage from a bluff face.

By studying the effects of landslides in slide prone areas, we can plan for the future. More needs to be done to educate the public and to prevent development in vulnerable areas. Some landslide hazards can be mitigated by engineering, design, or construction so that risks are acceptable. When technology cannot reduce the risk to acceptable levels, building in hazardous areas should be avoided.[41]

Stream and riverbank erosion, road building, or other excavation can remove the toe or lateral slope and exacerbate landslides. Seismic or volcanic activity often triggers landslides as well. Urban and rural living with excavations, roads, drainage ways, landscape watering, logging, and agricultural irrigation may also disturb the solidity of landforms. In general, any land use changes that affect drainage patterns or that increase erosion or change ground-water levels can augment the potential for landslide activity.

Landslides are a recurrent menace to waterways and highways and a threat to homes, schools, businesses, and other facilities. The unimpeded movement over roads—whether for commerce, public utilities, school, emergencies, police, recreation, or tourism—is essential to the normal functioning of Idaho County. The disruption and dislocation of these or any other routes caused by landslides can quickly jeopardize travel and vital services. Although small slumps on cut and fill slopes along roads and highways is relatively common, nearly all of the more significant landslide risk in Idaho County is associated with the steeper, mountainous slopes in the northwestern portion of the county.

Second-Order Hazard Events

Landslide events are often caused by other types of hazard events, but the costs of cleaning up after a landslide including road and other infrastructure repairs can often dwarf the damages of the initial hazard. The following chart outlines the interconnection between landslides and other types of hazard events.

Table 6.2. Second-Order Hazards Related to Landslide Events.

Related Causal Events	Related Effects
Flood	Transportation System
Earthquakes	Power Outage
Wildland Fire	

[41] Canning, Douglas J. "*Geologically Hazardous Areas"*. Shorelands and Environmental Assistance Program. Washington Department of Ecology. Olympia, Washington.

Jurisdictional Risk and Vulnerability Assessment

Idaho County Annex

Landslide Profile

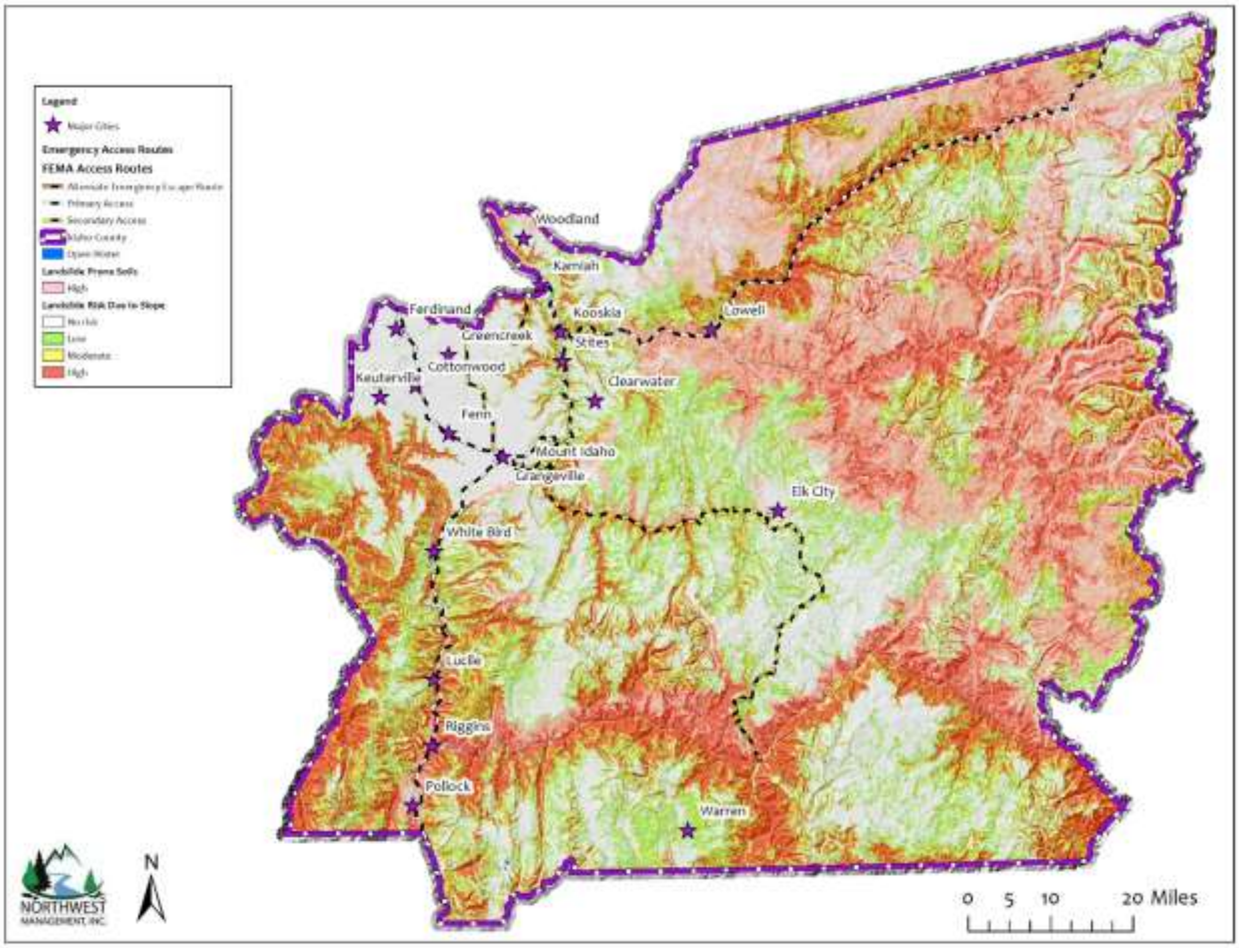
Idaho County covers a large variety of terrain from the Snake River at the bottom of Hells Canyon on the west to the spine of the Bitterroot Mountains on the Idaho and Montana border in the east. Idaho County spans several wilderness areas including; the River of No Return, Gospel Hump, and Selway-Bitterroot. Idaho County's geology is complex and diverse.

Soil factors that increase the potential for landslide are soils developed from parent materials high in schist and granite, and soils that are less permeable containing a resistive or hardpan layer. These soils tend to exhibit higher landslide potential under saturated conditions than do well-drained soils. To identify the high-risk soils in Idaho County, the NRCS State Soils Geographic Database (STATSGO) layer was used to identify the location and characteristics of all soils in the County. The specific characteristics of each major soil type within the County were reviewed. Soils information that suggested characteristics pertaining to very low permeability and/or developed a hardpan layer and soils developed from schist and granite parent material were selected as soils with potential high landslide risk. High-risk soils magnify the effect slope has on landslide potential. Soils identified as having high potential landslide risk are further identified only in areas with slopes between 14° and 30° (25-60%). It is these areas that traditionally exhibit the highest landslide risk due to soil characteristics within a given landscape.

To portray areas of probable landslide risk due to slope related factors, slope models were used to identify areas of low, moderate, and high risk. This analysis identified the low risk areas as slopes in the range of 20°-25° (36-46%), moderate as 26°-30° (48-60%), and high risk as slopes in the range of 31°-60° (60-173%). Slopes that exceeded 60° (173%) were considered low risk due to the fact that sliding most likely had already occurred relieving the area of the potential energy needed for a landslide. From the coverage created by these two methods, it is possible to depict areas of assumed risk and their proximity to development and human activity. With additional field reconnaissance the areas of high risk can be further defined by overlaying additional data points identifying actual slide locations, thus improving the resolution by specifically identifying the highest risk areas. This method of analysis is similar to a method developed by the Clearwater National Forest in north central Idaho.[42]

[42] McClelland, D.E., et al. 1977. Assessment of the 1995 and 1996 floods and landslides on the Clearwater National Forest Part 1: Landslide Assessment. Northern Region U.S. Forest Service. December 1977.

Figure 6.1. Landslide Prone Landscapes Map of Idaho County.



Idaho County has a moderate to high risk of experiencing future landslide events; however, much of the highest risk areas are located in the vast acres of backcountry forest and rangelands. Although slides in less populated areas could have significant impacts, it is less likely that structures, infrastructure, or lives will be lost as a direct result of the slide. Communities and infrastructure in the river canyons tend to have the highest risk of landslides due to the steep topography and soil types on the adjacent slopes. Most of the major transportation highways in Idaho County are also located along these river corridors making them highly susceptible to slides. Interruption or closure of these routes could result in the isolation of several communities and slow delivery of necessary supplies. Power outages and loss of communication infrastructure could also result from slides along the rivers where these systems are already somewhat vulnerable.

The Idaho County communities of; Grangeville, Cottonwood, and Ferdinand have very little risk of experiencing major property damage or loss of life due to landslides. The communities throughout the county that are located within a steep narrow drainage such as; Riggins, White Bird, Stites, Kamiah, and Kooskia are at a moderate to high risk.

The community of Pollock is located along the Little Salmon River in southern Idaho County. This area is characterized by the steep slopes rising from the Little Salmon River and its many tributaries. Mixed conifer forests and open grassy slopes surround this relatively isolated community for many miles. Much of the Pollock area is at a high risk of landslides, which could damage numerous structures as well as cut off Highway 95, Idaho's main north/south transportation corridor. Pollock has been an area of active landslide activity in the geologic past as well as in the present. Factors leading to slope instability have been present in the area since ancient times.

Fires in the Pollock area can cause a domino effect of multiple hazards. Higher intensity fires not only remove most of the vegetation, but they also cause soils to become hydrophobic or water repellent for a period of time after the fire. This combination leads to unusually high runoff after rain showers or during the spring runoff season. As streams and rivers begin to reach and exceed flood stage, bank failures and channel migration are common. Road building and other soil disturbances tend to exacerbate this effect leading to even more severe landslides.

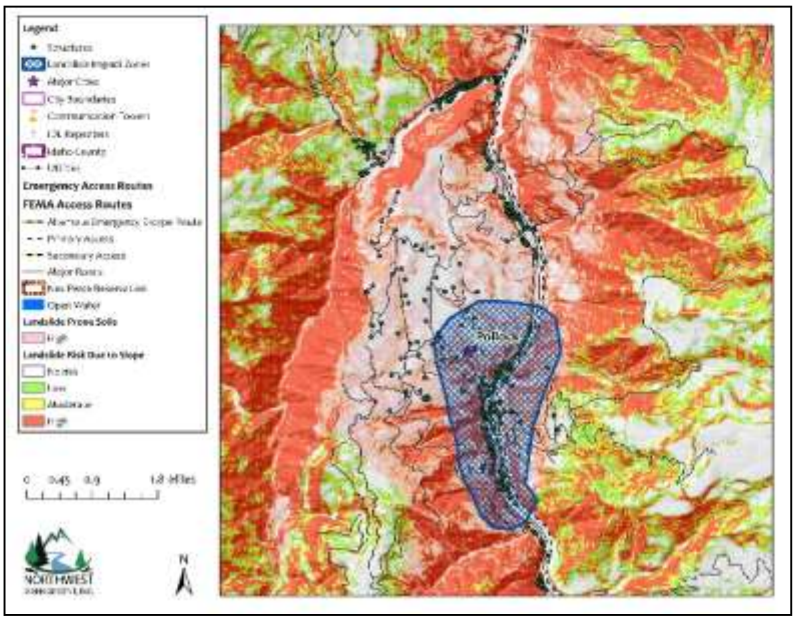


Figure 6.2. Pollock Landslide Impact

Individual homes in Pollock are at moderate to high risk to landslide activity. Homes and travel routes that have been constructed at the mouths of drainages and through alluvial deposits are at an increased risk of being affected by landslide activity. These historic deposits are a strong indicator of debris flows in the future. Furthermore, these deposits tend to be unstable and somewhat prone to movement. Debris flow activity and the resulting alluvial sediment deposition is associated with soil saturation and precipitation events. As mentioned, landslide events are generally associated with large precipitation events. The probability of these events occurring during normal weather conditions is quite low. However, during large precipitation events, residents and county representatives should monitor this area for landslide activity.

The location of landslide deposits in canyons is controlled by the presence of sedimentary interbeds, the hydrologic regime, and the occurrence of basalt overlying clay-rich weathered basement rocks. The largest landslides occur where canyon cutting has exposed landslide-prone sediments to steep topography. Today, initiation and reactivation of landslides is closely tied to unusual climatic events and land-use changes. Even small landslide activity on the upper parts of the slopes can transform into high-energy debris flows that endanger roads, buildings, and people below. Landslide debris is highly unstable when modified through natural variations in precipitation, artificial cuts, fills, and changes to surface drainage and ground water.[43]

Most of the communities in Idaho County have a moderate chance of being directly affected by landslides. Transportation corridors however, may be severely impacted and often are at the most risk of landslides. Landslides that occur on primary transportation routes can indirectly affect the communities of Idaho County and the State of Idaho.

Figure 5.9 shows other landslide impact zones through unincorporated parts of Idaho County. These all have similar conditions to the scenario mentioned above for the Pollock landslide impact zone.

Local Event History

February 17th, 1986 - A winter storm brought several mudslides to Idaho and Clearwater Counties. Mud and rock covered Highway 95 near the White Bird Hill. Highway 12 was closed between Lowell and the Montana line due to slides. Clear Creek Road near Kooskia was also closed due to flooding and rock slides.

March 12th, 1997 - Mudslides totaling $9.5 million in damages plagued north Idaho. In Idaho County, a 1.5 mile stretch on Carrot Ridge Road between Greer and Woodland cost $46,000 to repair slide damages.

1996/1997 - Landslides occurred throughout southwestern and west-central Idaho during a major flooding event in 1996/1997. The landslides were associated with heavy and prolonged precipitation, warm temperatures, and certain topographic, geologic, and soil characteristics. The effects of these landslides included damage to and closure of highways, destruction of power and telephone lines, buildings and vehicles, burial and flooding of irrigation facilities, and damming and sedimentation of rivers and streams. Total damages exceeded $1.6 million in Adams County and $2.5 million in Idaho County.

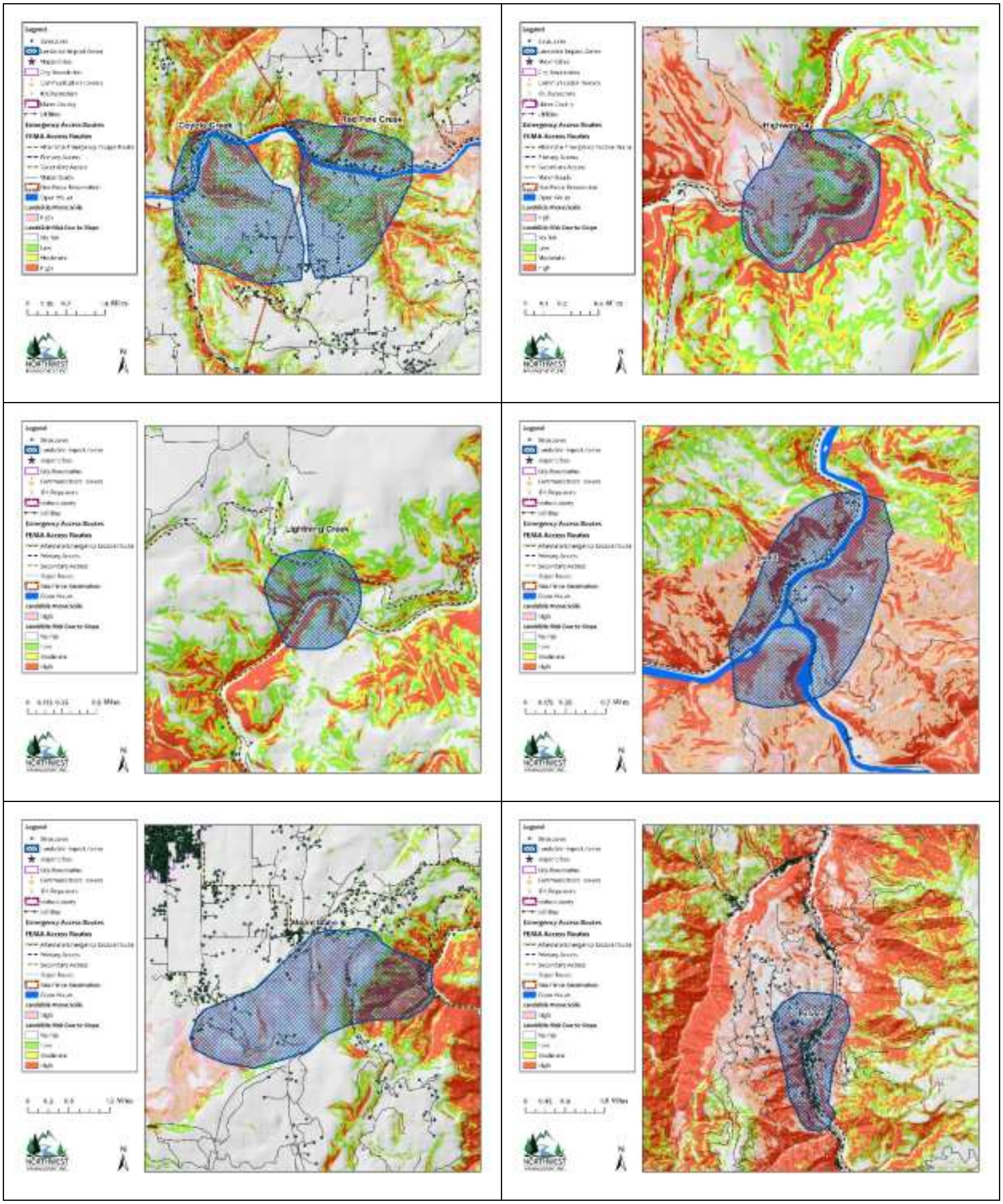
Recent slides have occurred along Highway 12 near the Kamiah Bridge, which slowed traffic flow and resulted in repair costs. Additionally, Lolo Pass on Highway 12 has been closed on several recent occasions due to avalanches. The 2008 avalanches closed U.S. Highway 12 for several days and nearly caused several accidents.

May 13, 2012 – A heavy rain event caused a debris slide/slope failure along Leitch Creek southeast of Kooskia. Damages resulted in a County and State Declaration to acquire funding for repairs to the slope and roadway.

---

[43] Weisz, D.W., K.L. Othberg, and R. M. Breckenridge. 2003. Surficial Geological Map of the Payette Quadrangle, Idaho and Lewis Counties, Idaho. Idaho Geological Survey Map, scale 1:24,000.

Figure 6.3. County Landslide Impact Zones.



Probability of Future Occurrence

The majority of the landslide potential in Idaho County occurs in the steep canyons along the Salmon River, Little Salmon River, and Clearwater River and their tributaries. These canyons have a high propensity for slides based on the steeper slopes, unstable soils, and history of occurrence. Wildfires and/or severe storms that saturate the soils could lead to major slide events in these areas. The probability of occurrence of major, high velocity landslide events in this area, including those caused by severe local storms, is high. The probability of other areas in Idaho County experiencing a landslide event is low to moderate.

Impacts of Landslide Events

In Idaho County, minor landslides along toe-slopes and roadways occur annually with minimal impact to local residents. Population centers and individual homes in the Salmon River (Pinehurst, Pollock, Riggins, Lucile, Slate Creek, and White Bird) and Lochsa River (Lowell and Powell) corridors have the highest risk of experiencing slides; however, most of the damage from slides in Idaho County will likely occur along roadways. Major landslides in communities that are situated along river corridors could cause property damage, injury, and death and may adversely affect a variety of resources. For example, water supplies, fisheries, sewage disposal systems, forests, dams, and roadways can be affected for years after a slide event. The negative economic impacts of landslides include the cost to repair structures, loss of property value, disruption of transportation routes, medical costs in the event of injury, and indirect costs such as lost timber and fisheries. U.S. Highway 95 has experienced numerous slides of varying severity that have blocked one or both lanes for several days. As the sole north-south transportation route from southern Idaho to northern Idaho, closures along this roadway greatly impact the delivery of necessary supplies to Idaho County. Closure of Highways 12 and 14 due to slides could effectively isolate the communities of Elk City, Lowell, and Powell, particularly during the winter months when all other forest routes are closed.

Slides in the river and stream drainages may also block the channel causing water to back up and spill over into areas not previously at risk to flooding. Numerous communities and homes could be at risk if this type of event were to occur. In many cases, a slide blocking the water channel would also cut off emergency access routes as many roads in Idaho County parallel the streams and rivers.

Stream channel erosion and natural meandering may also cause small slides or cave-ins along the river banks. Migration of the stream channels may result in the loss of traditional land uses over long periods of time.

Water availability, quantity, and quality can be affected by landslides and would have a very significant economic impact on Idaho County. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

The cost of cleanup and repairs of roadways is difficult to estimate due to the variable circumstances with each incident including size of the slide, proximity to a State or County shop, and whether the slide occurred on the cut slope or the fill slope. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to anticipate; thus, no repair costs for damaged roadways have been estimated.

Table 6.3. Landslide Impact Zones in Idaho County.			
Landslide Impact Zone	Number of Structures	Number of Acres	Value of Structures at Risk
Riggins	400	2,834	$42,739,200
Pollock	125	2,335	$9,914,250
Mount Idaho	39	2,570	$3,093,246
Highway 14	2	281	$158,628
Lightning Creek	1	255	$79,314
Stites	232	2,139	$10,974,528
Kooskia	422	1,390	$25,029,242
Kamiah	753	6,888	$76,696,062
Lowell	28	1,163	$2,220,792
Coyote Creek	32	3,138	$2,538,048
Red Pine Creek	38	2,827	$3,013,932

The values provided in the table above represent the average value of improvements for the closest jurisdiction to the individual landslide impact zone.

Slides in the identified Impact Zones are more likely to be larger and more damaging as weaknesses in th e underlying rock formations give way. Although infrequent, this type of slide has the potential to not only block, but destroy road corridors, dam waterways, and demolish structures. The highest risk areas in these impact zones are typically at the higher elevations where slopes exceed 25% grade. There is a significant amount of structures in the Pinehurst, Riggins, and White Bird Landslide Impact Zones. Single slide events will not likely impact the entire population, but rather individual structures. Many of the main access and secondary roads could also be at risk from slides initiating in these impact zones.

Individual Community Assessments

City of Grangeville

Landslide Profile

The city of Grangeville has very little risk to landslides due to the flat topography of the surrounding area and the built environment. Small slumps make occur along some roadways, but these are not likely to cause significant damage to the community.

Probability of Future Occurrence

The city of Grangeville has a very low probability of experiencing damaging landslides. The few slopes in and around the community are generally less than 10% grade. While small, low angle slumps may occur on eyebrows of the surrounding rolling hills, these will be infrequent and likely the result of water saturation or a major disturbance such as an earthquake or road construction.

Impacts of Landslide Events

Grangeville may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on Grangeville. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

There are no structures or infrastructure directly at risk from landslides within the city of Grangeville. The cost of cleanup and repairs of roadways is difficult to estimate due to the variable circumstances with each incident including size of the slide, proximity to a State or County shop, and whether the slide occurred on the cut slope or the fill slope. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to anticipate; thus, no repair costs for damaged roadways have been estimated.

City of Ferdinand

Landslide Profile

The city of Ferdinand has very little risk to landslides due to the flat topography of the surrounding area and the built environment. Small slumps make occur along some roadways, but these are not likely to cause significant damage to the community.

Probability of Future Occurrence

The city of Ferdinand has a very low probability of experiencing damaging landslides. The few slopes in and around the community are generally less than 10% grade. While small, low angle slumps may occur on eyebrows of the surrounding rolling hills, these will be infrequent and likely the result of water saturation or a major disturbance such as an earthquake or road construction.

Impacts of Landslide Events

Ferdinand may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on Ferdinand. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

There are no structures or infrastructure directly at risk from landslides within the city of Ferdinand. The cost of cleanup and repairs of roadways is difficult to estimate due to the variable circumstances with each incident including size of the slide, proximity to a State or County shop, and whether the slide occurred on the cut slope or the fill slope. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to anticipate; thus, no repair costs for damaged roadways have been estimated.

City of Cottonwood

Landslide Profile

The city of Cottonwood has very little risk to landslides due to the flat topography of the surrounding area and the built environment. Small slumps make occur along some roadways, but these are not likely to cause significant damage to the community.

Probability of Future Occurrence

The city of Cottonwood has a very low probability of experiencing damaging landslides. The few slopes in and around the community are generally less than 10% grade. While small, low angle slumps may occur on eyebrows of the surrounding rolling hills, these will be infrequent and likely the result of water saturation or a major disturbance such as an earthquake or road construction.

Impacts of Landslide Events

Cottonwood may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on Cottonwood. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

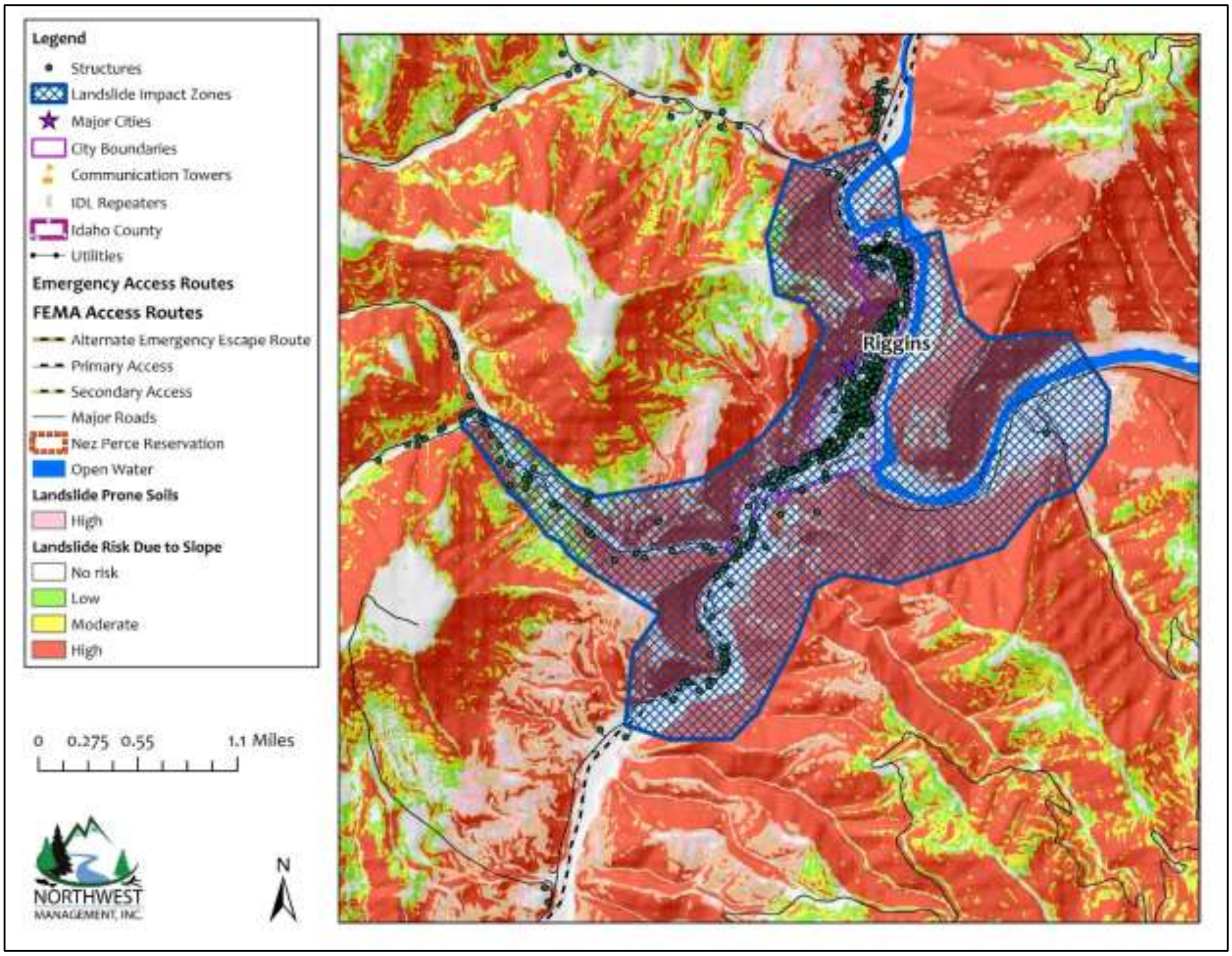
There are no structures or infrastructure directly at risk from landslides within the city of Cottonwood. The cost of cleanup and repairs of roadways is difficult to estimate due to the variable circumstances with each incident including size of the slide, proximity to a State or County shop, and whether the slide occurred on the cut slope or the fill slope. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to anticipate; thus, no repair costs for damaged roadways have been estimated.

City of Riggins

Landslide Profile

Riggins is located in the canyon of the Salmon River at the mouth of the Little Salmon River. The Salmon and Little Salmon Rivers have cut deep canyons into the Salmon Mountains and the basalt flows that underlie much of the area. The Riggins area has been an area of active landslide activity in the geologic past as well as in the present. The factors that lead to slope instability have been present in the area since ancient times. Although recent years have not seen the same level of activity that was typical in ancient times, these characteristics remain. The largest landslides occur where canyon cutting has exposed landslide-prone sediments to steep topography. Today, initiation and reactivation of landslides is closely tied to unusual climatic events and land-use changes. Even small landslide activity on the upper parts of canyon slopes can transform into high-energy debris flows that endanger roads, buildings, and people below. Landslide debris is highly unstable when modified through natural variations in precipitation, artificial cuts, fills, and changes to surface drainage and ground water.[44]

Figure 6.4. Riggins Landslide Impact Zone.



The main access route to and from Riggins is U.S. Highway 95. Much of this highway travels along river corridors with steep slopes abutting the roadway. Landslides affecting this travel route can have a significant impact on the community of Riggins as supplies and other commerce must bypass the city by traveling several hundred miles around. Additionally, residents of Riggins, particularly commuters could be cut-off from the only efficient access route.

The potential for debris flows and landslides would dramatically escalate in the event of a large wildland fire event that denudes the steep canyon slopes of vegetative cover. The loss of the vegetative cover reduces slope stability by removing much of the organic matter that helps absorb and intercept precipitation and anchor the fragile soil to the canyon walls.

[44] Weisz, D. W., K. L. Othberg, and R. M. Breckenridge. 2003. Surficial Geological Map of the Payette Quadrangle, Idaho and Lewis Counties, Idaho. Idaho Geological Survey.

Probability of Future Occurrence

The Idaho Geological Survey has aggressively been mapping surface geologic features along the Salmon River. These maps provide valuable information for planning of private and public land use by identifying areas of unstable geologic formations. This work indicates that there are numerous visible landslide blocks on many of the steep slopes above the community of Riggins and surrounding areas. The presence of these landslide blocks is a strong indicator of possible landslide activity in the future.

The Landslide Prone Landscapes model depicts Riggins as having a moderate to high risk of landslides as a result of the geology and soil parent material in the area.

Impacts of Landslide Events

Riggins may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on Riggins. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

Slides in the identified Riggins Impact Zone are more likely to be larger and more damaging as weaknesses in the underlying rock formations give way. Although infrequent, this type of slide has the potential to not only block, but destroy road corridors, dam waterways, and demolish structures. There are 400 structures with an estimated total value of $42,739,200 within the Impact Zone as well as sections of U.S. Highway 95. It is likely that all of these structures and infrastructure would be destroyed or severely damaged in the event of a major slide in this area.

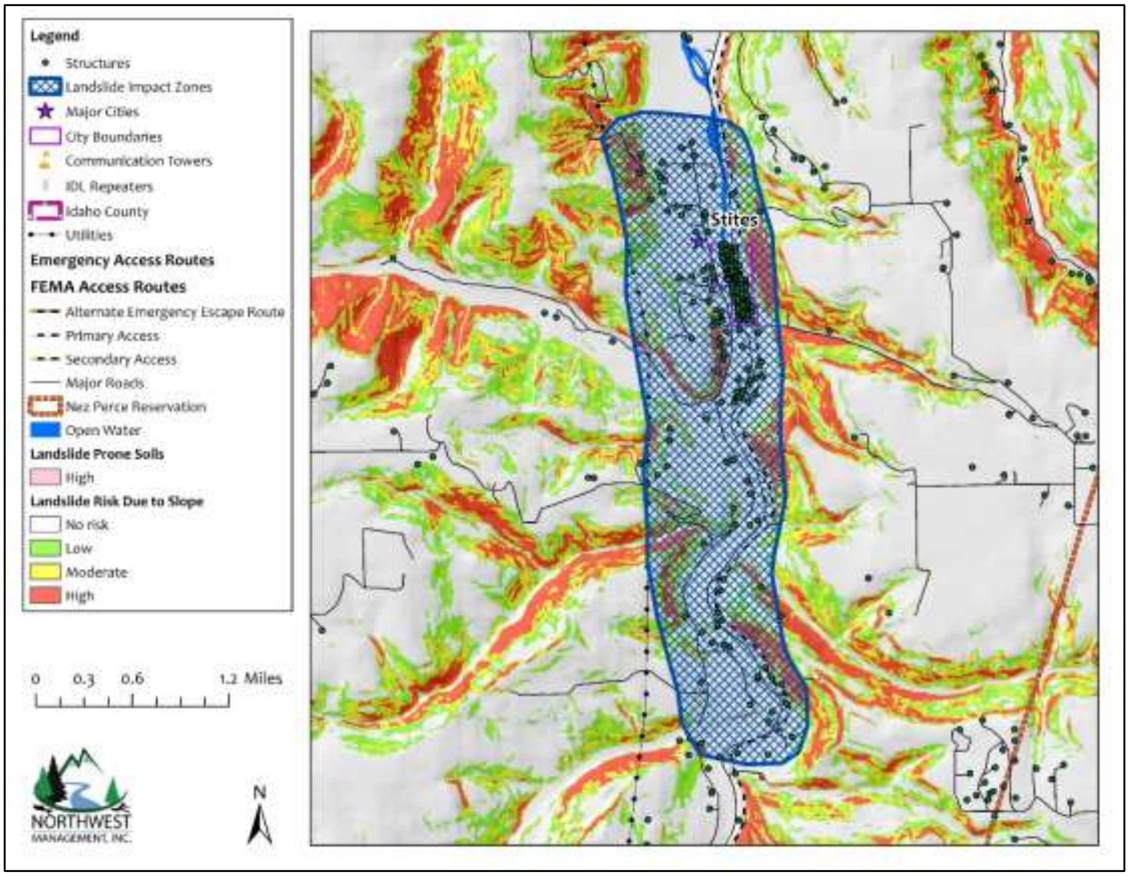
The cost of cleanup and repairs resulting from slumps along roadways is difficult to estimate due to the variable circumstances with each incident including the size of the slide and proximity to a Highway District shop. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to estimate; thus, no repair costs for damaged roadways are given.

City of Stites

Landslide Profile

Stites is located in the canyon of the Cottonwood Creek at its confluence with the South Fork of the Clearwater River. Cottonwood Creek and the South Fork have cut deep canyons into the Camas Prairie and the basalt flows that underlie much of the area. The Stites area has been an area of active landslide activity in the geologic past as well as in the present. The factors that lead to slope instability have been present in the area since ancient times. Although recent years have not seen the same level of activity that was typical in ancient times, these characteristics remain. The largest landslides occur where canyon cutting has exposed landslide-prone sediments to steep topography. Today, initiation and reactivation of landslides is closely tied to unusual climatic events and land-use changes. Even small landslide activity on the upper parts of canyon slopes can transform into high-energy debris flows that endanger roads, buildings, and people below. Landslide debris is highly unstable when modified through natural variations in precipitation, artificial cuts, fills, and changes to surface drainage and ground water.[45]

Figure 6.5. Stites Landslide Impact Zone.



The main access route to and from Stites is U.S. Highway 12 and State Highway 13. Much of these highways travel along river corridors with steep slopes abutting the roadways. Landslides affecting these travel routes can have a significant impact on the community of Stites as supplies and other commerce must bypass the city by traveling dozens of miles around. Additionally, residents of Stites, particularly commuters could be cut-off from the only efficient access route.

The potential for debris flows and landslides would dramatically escalate in the event of a large wildland fire event that denudes the steep canyon slopes of vegetative cover. The loss of the vegetative cover reduces slope stability by removing much of the organic matter that helps absorb and intercept precipitation and anchor the fragile soil to the canyon walls.

[45] Weisz, D. W., K. L. Othberg, and R. M. Breckenridge. 2003. Surficial Geological Map of the Payette Quadrangle, Idaho and Lewis Counties, Idaho. Idaho Geological Survey.

Probability of Future Occurrence

The city of Stites has a moderate probability of experiencing damaging landslides. The slopes in and around the community are generally greater than 35% grade. There are numerous buildings that abut the toeslope of the canyon wall on the east side of the city. Small, low angle slumps may occur on eyebrows of the surrounding rolling hills, these will be infrequent and likely the result of water saturation or a major disturbance such as an earthquake or road construction.

The Landslide Prone Landscapes model depicts Stites as having a low to moderate risk of landslides as a result of the geology and soil parent material in the area. However, Stites has been determined to have a moderate to high risk to landslides as a result of steep slopes throughout potions of the community.

Impacts of Landslide Events

Stites may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on Stites. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

Slides in the identified Stites Impact Zone are more likely to be larger and more damaging as weaknesses in the underlying rock formations give way. Although infrequent, this type of slide has the potential to not only block, but destroy road corridors, dam waterways, and demolish structures. There are 232 structures with an estimated total value of $10,974,528 within the Impact Zone as well as sections of State Route 13. It is likely that all of these structures and infrastructure would be destroyed or severely damaged in the event of a major slide in this area.

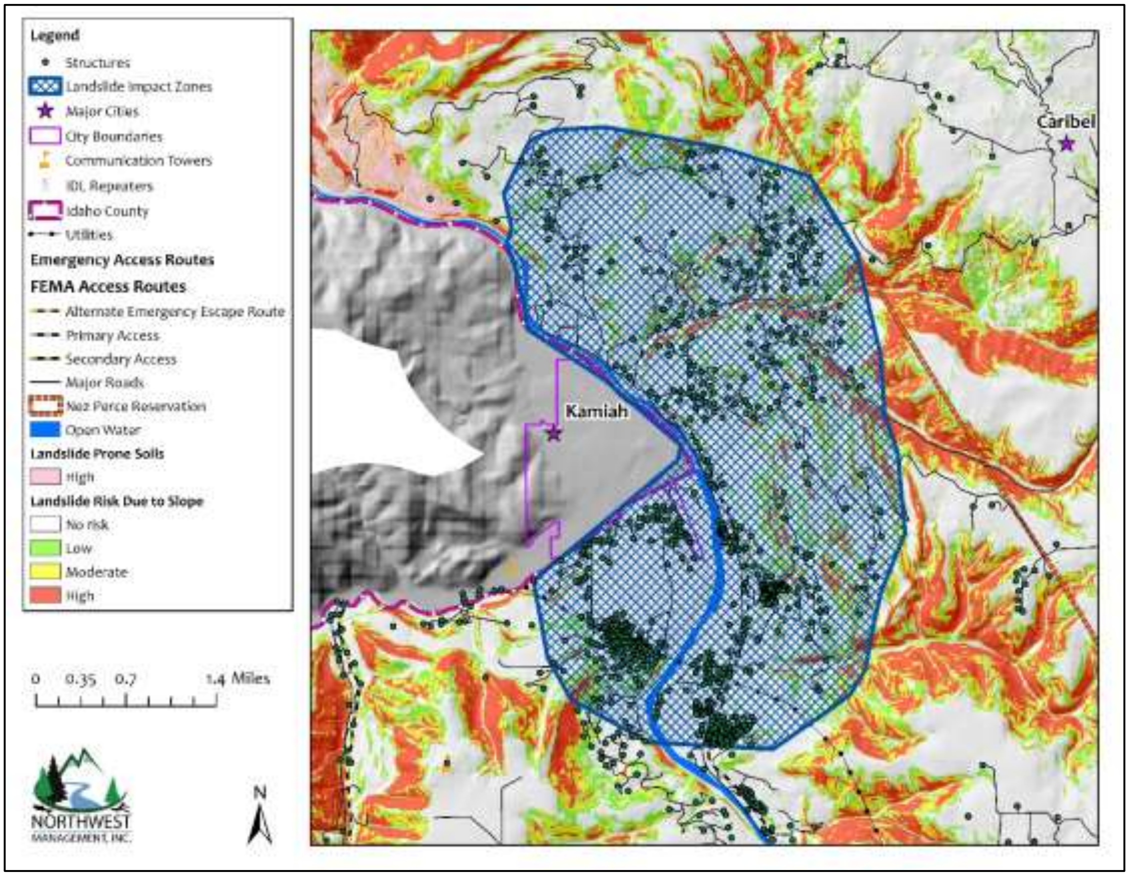
The cost of cleanup and repairs resulting from slumps along roadways is difficult to estimate due to the variable circumstances with each incident including the size of the slide and proximity to a Highway District shop. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to estimate; thus, no repair costs for damaged roadways are given.

City of Kamiah

Landslide Profile

Kamiah is located in the canyon of the Middle Fork of the Clearwater River at its confluence with the Lawyer Creek. Lawyer Creek and the Middle Fork have cut a deep canyons into the Camas Prairie and the basalt flows that underlie much of the area. The Kamiah area has been an area of active landslide activity in the geologic past as well as in the present. The factors that lead to slope instability have been present in the area since ancient times. Although recent years have not seen the same level of activity that was typical in ancient times, these characteristics remain. The largest landslides occur where canyon cutting has exposed landslide-prone sediments to steep topography. Today, initiation and reactivation of landslides is closely tied to unusual climatic events and land-use changes. Even small landslide activity on the upper parts of canyon slopes can transform into high-energy debris flows that endanger roads, buildings, and people below. Landslide debris is highly unstable when modified through natural variations in precipitation, artificial cuts, fills, and changes to surface drainage and ground water.[46]

Figure 6.6. Kamiah Landslide Impact Zone.



The main access route to and from Kamiah is U.S. Highway 12 and State Highway 162. Much of these highways travel along river corridors with steep slopes abutting the roadways. Landslides affecting these travel routes can have a significant impact on the community of Stites as supplies and other commerce must bypass the city by traveling dozens of miles around. Additionally, residents of Stites, particularly commuters could be cut-off from the only efficient access route.

The potential for debris flows and landslides would dramatically escalate in the event of a large wildland fire event that denudes the steep canyon slopes of vegetative cover. The loss of the vegetative cover reduces slope stability by removing much of the organic matter that helps absorb and intercept precipitation and anchor the fragile soil to the canyon walls.

[46] Weisz, D. W., K. L. Othberg, and R. M. Breckenridge. 2003. Surficial Geological Map of the Payette Quadrangle, Idaho and Lewis Counties, Idaho. Idaho Geological Survey.

Probability of Future Occurrence

The city of Kamiah has a low probability of experiencing damaging landslides. The few slopes in and around the community are generally less than 10% grade. While small, low angle slumps may occur on eyebrows of the surrounding rolling hills, these will be infrequent and likely the result of water saturation or a major disturbance such as an earthquake or road construction.

Impacts of Landslide Events

Kamiah may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on Kamiah. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

Slides in the identified Kamiah Impact Zone are more likely to be larger and more damaging as weaknesses in the underlying rock formations give way. Although infrequent, this type of slide has the potential to not only block, but destroy road corridors, dam waterways, and demolish structures. There are 753 structures with an estimated total value of $76,696,062 within the Impact Zone as well as sections of U.S. Highway 12 and State Routes 64 and 162. It is likely that all of these structures and infrastructure would be destroyed or severely damaged in the event of a major slide in this area.

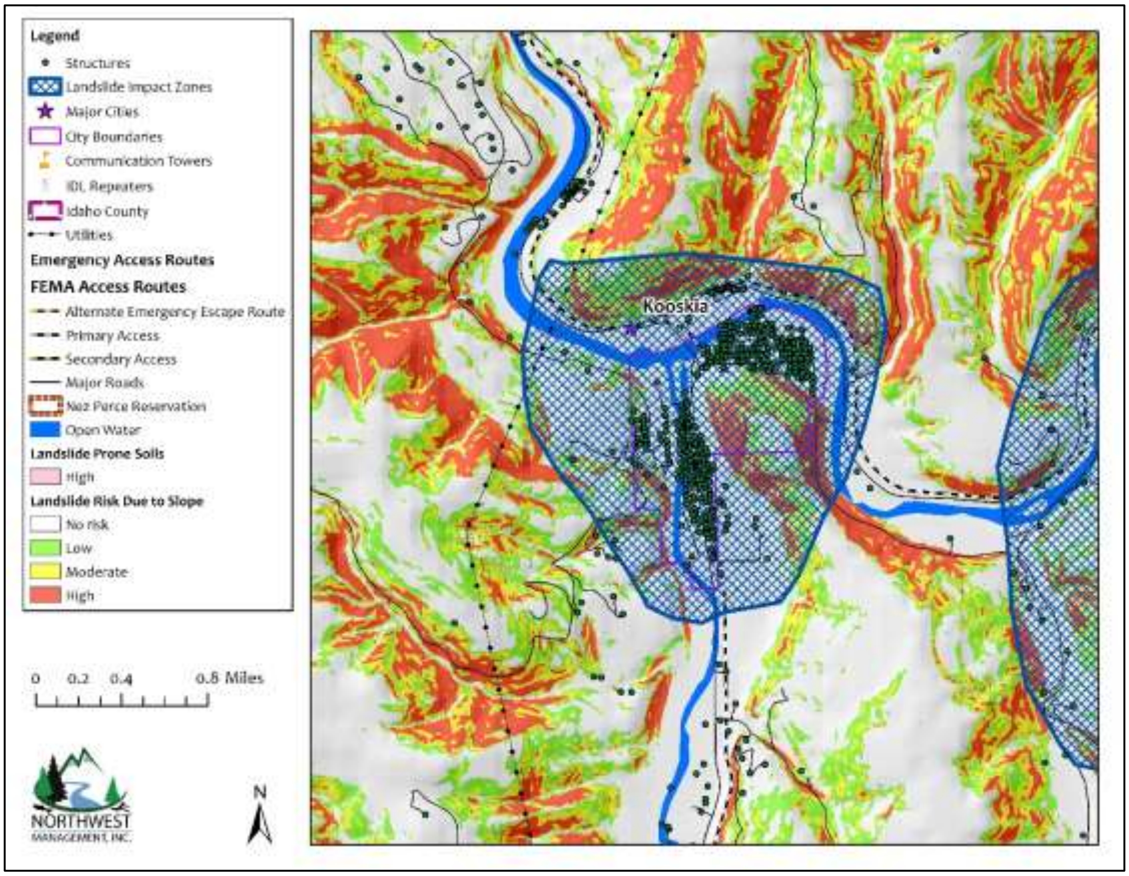
The cost of cleanup and repairs resulting from slumps along roadways is difficult to estimate due to the variable circumstances with each incident including the size of the slide and proximity to a Highway District shop. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to estimate; thus, no repair costs for damaged roadways are given.

City of Kooskia

Landslide Profile

Kooskia is located in the canyon of the confluence of the South and Middle Forks of the Clearwater River. The South and Middle Forks have cut a deep canyons into the Camas Prairie and the basalt flows that underlie much of the area. The Kooskia area has been an area of active landslide activity in the geologic past as well as in the present. The factors that lead to slope instability have been present in the area since ancient times. Although recent years have not seen the same level of activity that was typical in ancient times, these characteristics remain. The largest landslides occur where canyon cutting has exposed landslide-prone sediments to steep topography. Today, initiation and reactivation of landslides is closely tied to unusual climatic events and land-use changes. Even small landslide activity on the upper parts of canyon slopes can transform into high-energy debris flows that endanger roads, buildings, and people below. Landslide debris is highly unstable when modified through natural variations in precipitation, artificial cuts, fills, and changes to surface drainage and ground water.[47]

Figure 6.7. Kooskia Landslide Impact Zone.



The main access route to and from Kooskia is U.S. Highway 12 and State Highway 13. Much of these highways travel along river corridors with steep slopes abutting the roadways. Landslides affecting these travel routes can have a significant impact on the community of Kooskia as supplies and other commerce must bypass the city by traveling dozens of miles around. Additionally, residents of Kooskia, particularly commuters could be cut-off from the only efficient access route.

The potential for debris flows and landslides would dramatically escalate in the event of a large wildland fire event that denudes the steep canyon slopes of vegetative cover. The loss of the vegetative cover reduces slope stability by removing much of the organic matter that helps absorb and intercept precipitation and anchor the fragile soil to the canyon walls.

[47] Weisz, D. W., K. L. Othberg, and R. M. Breckenridge. 2003. Surficial Geological Map of the Payette Quadrangle, Idaho and Lewis Counties, Idaho. Idaho Geological Survey.

Probability of Future Occurrence

The city of Kooskia has a low to moderate probability of experiencing damaging landslides. The slopes in and around the community are generally greater than 35% grade. Small, low angle slumps may occur on eyebrows of the surrounding rolling hills, these will be infrequent and likely the result of water saturation or a major disturbance such as an earthquake or road construction.

The Landslide Prone Landscapes model depicts Kooskia as having a low to moderate risk of landslides as a result of the geology and soil parent material in the area. However, Kooskia has been determined to have a moderate to high risk to landslides as a result of steep slopes throughout potions of the community.

Impacts of Landslide Events

Kooskia may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on Kamiah. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

Slides in the identified Kooskia Impact Zone are more likely to be larger and more damaging as weaknesses in the underlying rock formations give way. Although infrequent, this type of slide has the potential to not only block, but destroy road corridors, dam waterways, and demolish structures. There are 422 structures with an estimated total value of $25,029,242 within the Impact Zone as well as sections of U.S. Highway 12 and State Route 13. It is likely that all of these structures and infrastructure would be destroyed or severely damaged in the event of a major slide in this area.

The cost of cleanup and repairs resulting from slumps along roadways is difficult to estimate due to the variable circumstances with each incident including the size of the slide and proximity to a Highway District shop. Other factors that could affect the cost of the damage may include culverts, streams, and removal of debris. This type of information is impossible to estimate; thus, no repair costs for damaged roadways are given.

City of White Bird

Landslide Profile

White Bird is located in the canyon of the White Bird Creek just upstream from its confluence with the Salmon River. The Salmon River and White Bird Creek have cut deep canyons into the Clearwater Mountains and the basalt flows that underlie much of the area. The White Bird area has been an area of active landslide activity in the geologic past as well as in the present. The factors that lead to slope instability have been present in the area since ancient times. Although recent years have not seen the same level of activity that was typical in ancient times, these characteristics remain. The largest landslides occur where canyon cutting has exposed landslide-prone sediments to steep topography. Today, initiation and reactivation of landslides is closely tied to unusual climatic events and land-use changes.

Even small landslide activity on the upper parts of canyon slopes can transform into high-energy debris flows that endanger roads, buildings, and people below. Landslide debris is highly unstable when modified through natural variations in precipitation, artificial cuts, fills, and changes to surface drainage and ground water.[48]

The main access route to and from White Bird is White Bird Hill Grade which is accessed via U.S. Highway 95 just south of the town site, as well as, several miles up the grade to the north. Both roads steadily climb White Bird Hill north of the community with steep slopes abutting the roadway. US Highway 95 follows the Salmon River canyon south of White Bird with steep slopes abutting the roadway here as well. Landslides affecting these travel routes can have an impact on the community of White Bird, however it is not expected to be a significant impact due to alternative routes in the region.

The potential for debris flows and landslides would dramatically escalate in the event of a large wildland fire event that denudes the steep canyon slopes of vegetative cover. The loss of the vegetative cover reduces slope stability by removing much of the organic matter that helps absorb and intercept precipitation and anchor the fragile soil to the canyon walls.

Probability of Future Occurrence

The Idaho Geological Survey has aggressively been mapping surface geologic features along the Salmon River. These maps provide valuable information for planning of private and public land use by identifying areas of unstable geologic formations. This work indicates that there are numerous visible landslide blocks on many of the steep slopes above the community of Riggins and surrounding areas. The presence of these landslide blocks is a strong indicator of possible landslide activity in the future.

The Landslide Prone Landscapes model depicts White Bird as having a moderate to high risk of landslides as a result of the geology and soil parent material in the area and due to steep slopes.

Impacts of Landslide Events

White Bird may be indirectly affected by landslides that adversely affect a variety of resources such as water supplies, fisheries, sewage disposal systems, forests, dams, and roadways upstream of the community. Water availability, quantity, and quality can be affected by landslides and could have a very significant economic impact on White Bird. The loss or redistribution of water would affect agricultural crops grown in certain areas, ranching activities, and personal and municipal wells.

Value of Resources at Risk

There are no structures or infrastructure directly at risk from landslides within the city of Grangeville. The cost of cleanup and repairs of roadways is difficult to estimate due to the variable circumstances with each incident including size of the slide, proximity to a State or County shop, and whether the slide occurred on the cut slope or the fill slope. Other factors that could affect the cost of the damage may

[48] Weisz, D. W., K. L. Othberg, and R. M. Breckenridge. 2003. Surficial Geological Map of the Payette Quadrangle, Idaho and Lewis Counties, Idaho. Idaho Geological Survey.

include culverts, streams, and removal of debris. This type of information is impossible to anticipate; thus, no repair costs for damaged roadways have been estimated.

Chapter 7

Severe Weather Hazard Profile

IN THIS SECTION:

- Regional and Local Hazard Profile
- Jurisdictional Risk and Vulnerability Assessment
- Individual Community Assessments

This Page Intentionally Left Blank

Chapter 7 – Severe Weather

Regional and Local Hazard Profiles

Severe storms are a serious hazard that can and do affect Idaho on a regular basis. Severe storms affect the entire state with varying degrees, due to the complex landscape and the influence from the Pacific Ocean. Although Idaho's climate sees relatively few damaging storms in comparison with the rest of the nation, it still poses a significant hazard to the state and local communities. Storm-related Presidential Disaster declarations were made for Idaho in 1964, 1972, 1974, 1996, 1997, 2005, 2006, and 2010. Most of these storms resulted in flood damages.

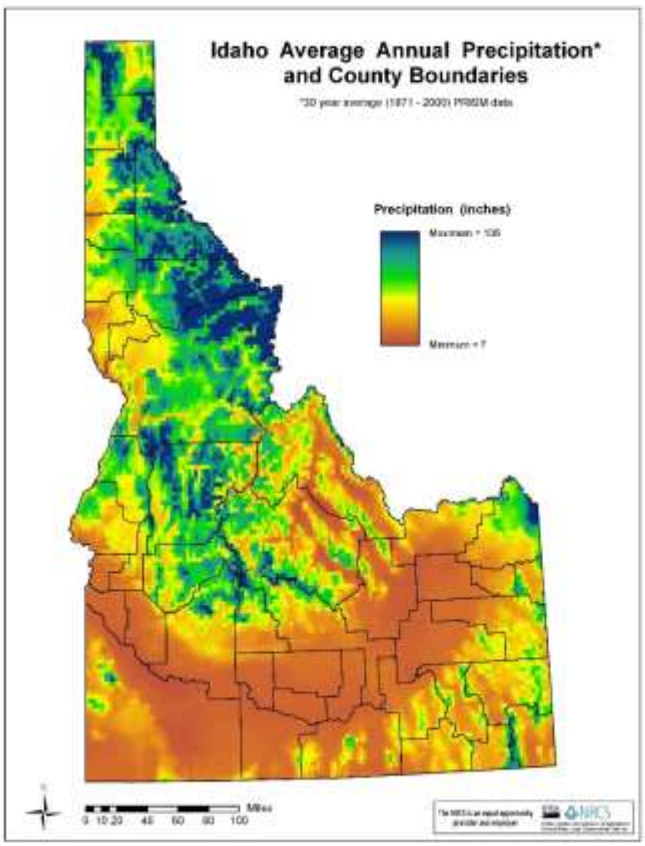
In the Idaho Panhandle, the main barrier is the rugged chain of Bitterroot Mountains forming much of the boundary between Idaho and Montana. The extreme range of elevation in the State is from 738 feet above sea level at the confluence of the Clearwater and Snake Rivers to 12,655 feet at Mt. Borah in Custer County. Comprised of rugged mountain ranges, canyons, high grassy valleys, arid plains, and fertile lowlands, the State reflects in its topography and vegetation a wide range of climates. Located some 300 miles from the Pacific Ocean, Idaho is influenced by maritime air borne eastward on the prevailing westerly winds. Particularly in winter, the maritime influences are noticeable in the greater average cloudiness, greater frequency of precipitation, and mean temperatures, which are above those at the same latitude and altitude in mid-continent regions. This maritime influence is most marked in the northern part of the State, where the air arrives via the Columbia River Gorge with a greater burden of moisture than at lower latitudes.

The pattern of average annual temperatures for the State indicates the effect both of latitude and altitude. The highest annual averages are found in the lower elevations of the Clearwater and Little Salmon River Basins, and in the stretch of the Snake River Valley from the vicinity of Bliss downstream to Lewiston, including the open valleys of the Boise, Payette, and Weiser Rivers. The range between the mean temperature of the coldest and warmest months of the year varies from less than 40°F at a number of northern stations, to well over 50° F at stations in the higher elevation of the central and eastern parts of the State. In general, it can be said that monthly means are 32° F or lower at stations above 5,000 feet from November through March; 4,000 and 5,000 feet from November through February; 3,000 to 4,000 feet from December through February; and 2,000 to 3,000 feet only one or two months of the year. In summer, periods of extreme heat extending beyond a week are quite rare and the same can be said of periods of extremely low temperatures in winter. In both cases the normal progress of weather systems across the State usually results in a change at rather frequent intervals. In the realm of extremely low temperatures, two winters stand out in the records for the State: 1937-38 and 1948-49. The lowest monthly mean temperatures on record occurred throughout the State in January 1949 and many stations registered the absolute lowest temperature on record during that month.

To a large extent, the source of moisture for precipitation in Idaho is the Pacific Ocean. In summer there are some exceptions to this when moisture-laden air is brought in from the south at high levels to produce thunderstorm activity, particularly in the eastern part of Idaho. The source of this moisture from the south is the Gulf of Mexico and Caribbean region. The average precipitation map for Idaho is as complex as the physiographic representation of the State. Partly because of the greater moisture supply in the west winds over the northern part of the State (less formidable barriers to the west) and partly because of the greater frequency of cyclonic activity in the north, the average valley precipitation is considerably greater in north Idaho than in the southern regions of the State.

Thunderstorms do occur within Idaho affecting almost all counties, including Idaho County, but usually are localized events. Their impacts are fairly limited and do not significantly affect the communities enough to declare a disaster. Thunderstorms are emphasized within the flood chapter of this Multi-Hazard Mitigation Plan.

Figure 7.1. Average Annual Precipitation in Idaho from 1971 to 2000.[49]



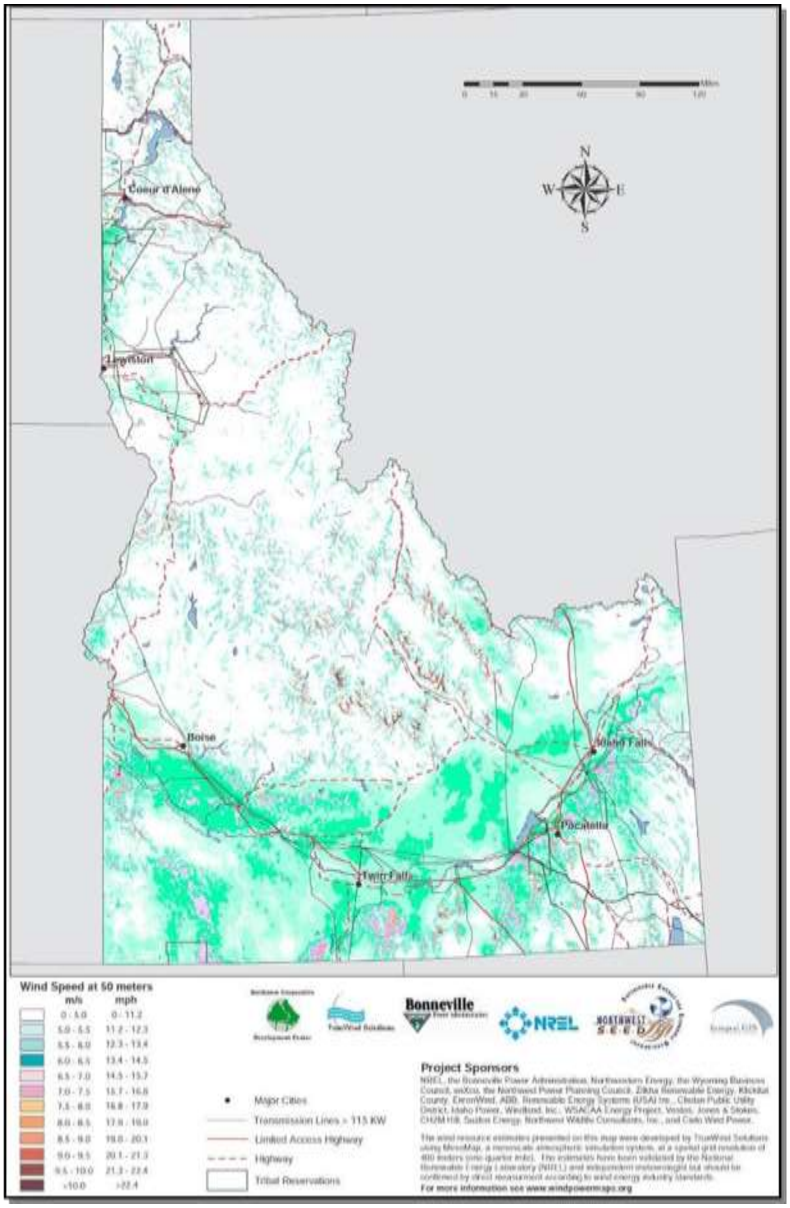
Snowfall distribution is affected both by availability of moisture and by elevation. Annual snowfall totals in Shoshone County in northern Idaho have reached nearly 500 inches. The greatest long-term (1942-56) seasonal average was 182 inches at Mullan Pass, while the greatest snow depth (also 182 inches) was recorded at that station on February 20, 1954. The major mountain ranges of the State accumulate a deep snow cover during the winter months and the release of water from the melting snow-pack in late spring furnishes irrigation water for more than two million acres, mainly within the Snake River Basin above Weiser. Irrigation water supplies are nearly always plentiful, except on some of the smaller projects where storage facilities are inadequate. Hydro-electric power is generated by the waters of the many rivers in Idaho.

Winter storms are a part of life in Idaho. They vary in degree and intensity and can occur at any time but are especially probable between September and May. These storms could be localized or could affect the entire state. They can last a matter of minutes or many days. Typically, winter storms are measured by

[49] Western Regional Climate Center. Historical Climate Information. Precipitation Maps: 1971-2000. Available online at http://www.wrcc.dri.edu/pcpn/id.gif.

the amount of snow accumulated during any given storm. Additionally, these storms could be measured by the accompanying wind or associated temperatures.

Figure 7.2. Idaho Average Wind Speed Map.[50]



Windstorms are not uncommon in Idaho, but the State has no destructive storms such as hurricanes, and an extremely small incidence of tornadoes. Windstorms associated with cyclonic systems, and their cold fronts, do some damage to trees each year, often causing temporary disruption of power and communication facilities, but only minor damage to structures in most instances. Storms of this type may occur at any time from October into July, while during the summer months strong winds almost invariably accompany thunderstorms.

Hail damage in Idaho is very small in comparison with damage in areas of the central part of the United States. Often the hail that occurs does not grow to a size larger than one-half inch in diameter and the areas affected are usually small. Quite often hail comes during early spring storms, when it is mostly of the small, soft variety with a limited damaging effect. Later when crops are more mature and more susceptible to serious damage, hail occurs in widely scattered areas in connection with summer thunderstorms. The incidence of summer thunderstorms is greatest in mountainous areas with lightning often causing forest and range fires.

[50] True Wind Solutions. 2002. Map of approximate wind speeds in Idaho. Available online at www.windpowermaps.org.

Past weather patterns show that severe weather conditions are likely to happen in any part of Idaho County in any given year. The topographical features of the county contribute greatly to the various weather patterns that occur. The following table lists the average climate within Idaho County.

Table 7.1. Weather Data for Idaho County.

Temperature		**Degrees (F)**
	Lowest Average Daily Minimum Temperature	24.2 (Grangeville)
	Highest Average Daily Maximum Temperature	82.9 (Grangeville)
	Hottest Month	July/August
	Coldest Month	December/January
Precipitation	**Type**	**Inches**
	Average Annual Total Precipitation	23.94" (Grangeville)
	Elevation	
	3,399 Feet (Grangeville)	

Storms are naturally occurring atmospheric disturbances manifested in strong winds accompanied by rain, snow, or other precipitation and often by thunder or lightning. All areas within this region are vulnerable to severe local storms. The effects are generally transportation problems and loss of utilities. When transportation accidents occur, motorists are stranded and schools and businesses close. The effects vary with the intensity of the storm, the level of preparation by local jurisdictions and residents, and the equipment and staff available to perform tasks to lessen the effects of severe local storms. There is no way to prevent severe storms. The weather forces and topography of Idaho County will always dictate when and where severe storms will occur.

Drought is an expected phase in the climactic cycle of almost any geographical region. Objective, quantitative definitions for drought exist but most authorities agree that, because of the many factors contributing to it and because its onset and relief are slow and indistinct, none are entirely satisfactory. According to the National Drought Mitigation Center, drought originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. What is clear is that a condition perceived as "drought" in a given location is the result of a significant decrease in water supply relative to what is "normal" in that area.[51]

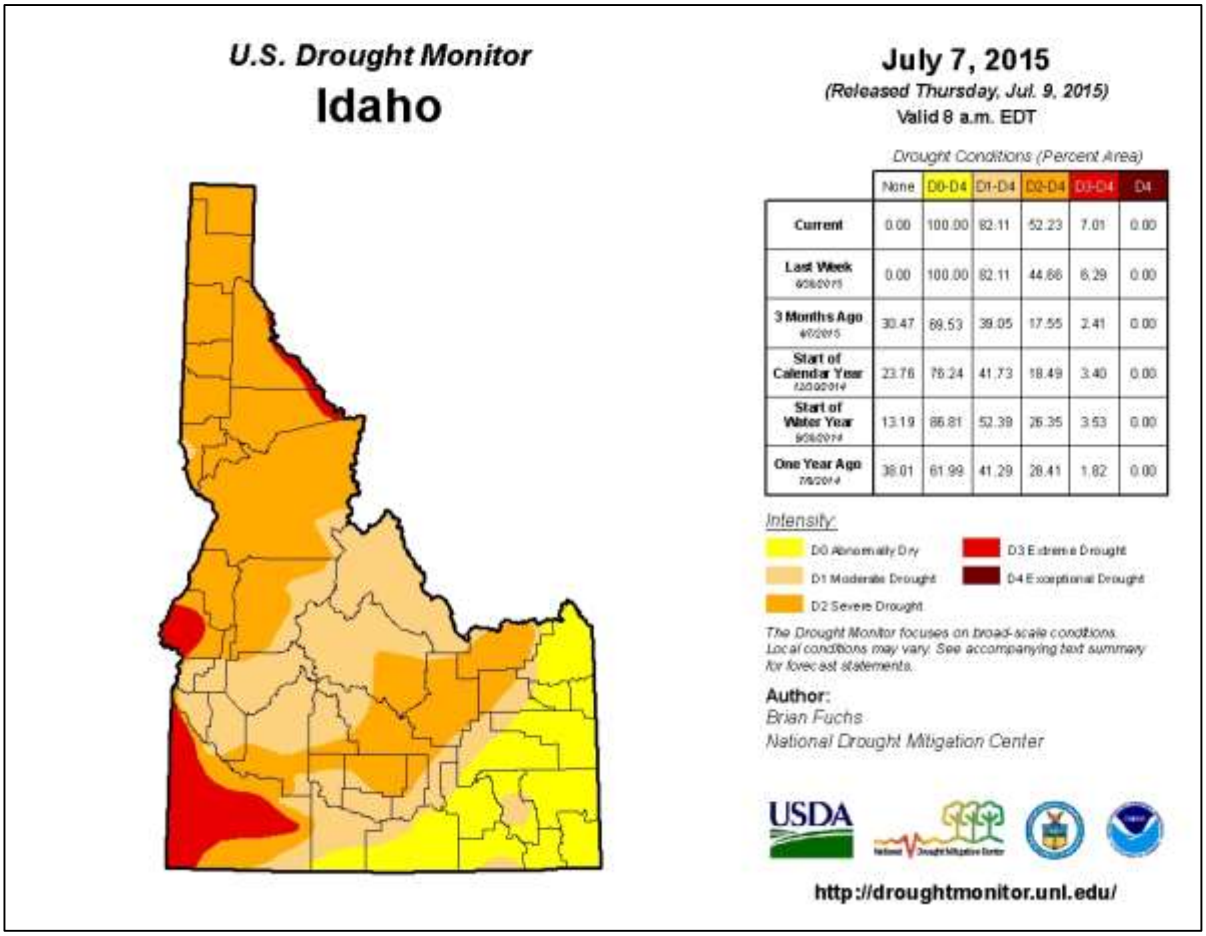
[51] National Oceanic & Atmospheric Administration. 2010. U.S. Drought Monitor. Drought Information Center. U.S. Department of Agriculture. Available online at http://www.drought.noaa.gov/index.html.

It should be noted that water supply is not only controlled by precipitation (amount, frequency, and intensity), but also by other factors including evaporation (which is increased by higher than normal heat and winds), transpiration, and human use. Drought in Idaho is generally associated with a sustained period of low winter snowfall. This results from a temporary, yet significant, change in the large-scale weather patterns in the western U.S. The limited snow packs result in reduced stream flows and ground water recharge. Idaho's system of reservoirs and natural storage can buffer the effects of minor events over a few years, but a series of dry winters (or an especially pronounced single low snowfall event) will result in a shortage of available water. Extended periods of above-average temperatures during the spring and summer can increase the impacts of low snow packs.

The Idaho Department of Water Resources reports that meteorological drought conditions (a period of low precipitation) existed in the State approximately 30% of the time during the period 1931-1982. Principal drought in Idaho, indicated by stream flow records, occurred during 1929-41, 1944-45, 1959-61, 1977, and 1987-92.[52]

[52] Idaho Department of Water Resources. 2010. Idaho Drought Emergency Declarations. Available online at http://www.idwr.idaho.gov/News/drought/drought.htm.

Figure 7.3. United States Drought Monitor for July 14, 2015.[53]



Hazard management of drought involves the long-term reduction of the probable gap between water supply and demand. Supply can be addressed through the development of storage and delivery capacity (construction of reservoirs and associated facilities), improved operation of existing facilities, and weather modification. Demand can be addressed through various forms of conservation.[54]

Idaho County is relatively free of any significant mountain barriers to impede the normal movement of the moisture laden air masses from the Pacific Ocean. Most of the total annual precipitation is attributed to storms rotating around a center of low atmospheric pressure traveling on an easterly course. Average annual precipitation received by Idaho County ranges from 19.21 inches in Cottonwood to 25.8 inches at Elk City, with Grangeville and Kooskia receiving from 21 to 24 inches. The greatest amount of precipitation is received between January and February, normally in the form of snow, and very little precipitation

---

[53] U.S. Drought Monitor. Available online at http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?ID. Accessed January, 2015.

[54] Idaho Bureau of Homeland Security. 2010. State of Idaho Hazard Mitigation Plan. Hazard Mitigation Program. November 2007. Available online at http://www.bhs.idaho.gov/Resources/PDF/SHMPFinalw-signatures.pdf.

occurs during the summer months. The average annual snowfall can range from 21.1 inches at Kooskia to 42.6 inches at Cottonwood and as much as 128 inches at Lolo Pass in the northeastern corner of the County. The mean annual temperature varies from 51.4 degrees Fahrenheit at Elk City to 50.9 degrees Fahrenheit at Kooskia. The lowest temperature occurs between January and February, with Elk City reporting a maximum low of -43 degrees Fahrenheit in February 1996. The highest temperatures annually occur in July and August, and Kooskia reported a high of 116 degrees Fahrenheit in July 1934.

Storms are naturally occurring atmospheric disturbances manifested in strong winds accompanied by rain, snow, or other precipitation, and often by thunder or lightning. All areas within this region are vulnerable to severe local storms. The effects are generally transportation problems and loss of utilities. When transportation accidents occur, motorists are stranded and schools and businesses close. The effects vary with the intensity of the storm, the level of preparation by local jurisdictions and residents, and the equipment and staff available to perform tasks to lessen the effects of severe local storms.

Second-Order Hazard Events

Severe weather is often the causal factor in damages from other types of hazard incidents such as flood or wildland fire. The following chart outlines the interconnection between severe weather and other types of hazard events.

Table 7.2. Second-Order Hazards Related to Severe Weather Events.

Related Causal Events	Related Effects
None	Drought
	Crop Loss
	Tornado
	Wildland Fire
	Power Outage
	Transportation
	Flood

Jurisdictional Risk and Vulnerability Assessment

Idaho County Annex

Severe Weather Profile

Severe weather in Idaho County ranges from the commonly occurring thunderstorms to hail, high winds, tornadoes, drought, dense fog, lightning, and snow storms.

All of Idaho County is at risk to severe winter weather events and there is a high probability of their continued occurrence in this area. Commonly, higher elevations in the mountains will receive significant snowfall, while areas along the Weiser River may not. Periodically though, individual storms can generate enough force to impact the entire County at one time. From high winds to ice storms to freezing temperatures, there are all types of winter storms that take place during the course of any given year. Winter conditions can change very rapidly. It is not uncommon to have a snowstorm at night with sunshine the next day.

In Idaho County, ice storms occur when a layer of warm air is between two layers of cold air. Frozen precipitation melts while falling into the warm air layer, and then proceeds to refreeze in the cold layer above the ground. If the precipitate is partially melted, it will land on the ground as sleet. However, if the warm layer completely melts the precipitate, becoming rain, the liquid droplets will continue to fall, and pass through a thin layer of cold air just above the surface. This thin layer of air then cools the rain to a temperature below freezing (32°F). However, the drops themselves do not freeze, a phenomenon called supercooling. When the supercooled drops strike the ground or anything else below 32°F, they instantly freeze, forming a thin film of ice that can build up on trees, utilities, roads, and other structures, infrastructure, and personal property.[55]

Due to their relative frequency and minimal severity, severe thunderstorms are not well documented in Idaho County. Their impacts are fairly limited and do not significantly affect the communities. The secondary impacts of thunderstorms, floods, are emphasized within the flood sections of this document. Areas most vulnerable to this type of storm are those subject to a strong southwesterly flow of moist, unstable air that generates strong, sometimes violent thunderstorms with one or more of the following characteristics: strong damaging winds, large hail, waterspouts, or tornados.

Hail can occur in any strong thunderstorm, which means hail is a threat everywhere. Hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere. Large hail stones can fall at speeds faster than 100 miles per hour. Hail damage in Idaho is very small in comparison with damage in areas of the central part of the United States. Often the hail that occurs does not grow to a size larger than one-half inch in diameter and the areas affected are usually small. Quite often hail comes during early spring storms when it is mostly of the small, soft variety with a limited damaging effect. Later, when crops are more mature and more susceptible to serious damage, hail occurs in widely scattered spots in connection with summer thunderstorms.

Windstorms are frequent in Idaho County and they have been known to cause substantial damage. Under most conditions, the County's highest winds come from the northwest. However, during the summer months lightning and thunderstorms often come from the south to southwest. Due to the abundance of agricultural development in Idaho County, crop damage due to high winds can have disastrous effects on the local economy. In the case of extremely high winds, some buildings may be damaged or destroyed. Wind damages will generally be categorized into four groups: 1) structure damage to roofs, 2) structure damage from falling trees, 3) damage from wind-blown dust on sensitive receptors, or 4) wind driven wildfires. Structural injury from damaged roofs is not uncommon in Idaho County. Airborne particulate matter increases during high wind events. When this occurs, sensitive receptors including the elderly and those with asthma are at increased risk to complications. The National Weather Service defines high winds as sustained winds of 40 mph or gusts of 58 mph or greater, not caused by thunderstorms, expected to last for an hour or more.[56] Areas most vulnerable to high winds are those affected by a strong pressure

[55] Wikipedia. "Ice Storm". Wikimedia Foundation, Inc. March 2011. Available online at http://en.wikipedia.org/wiki/Ice_storm.

[56] http://www.nhc.noaa.gov/aboutgloss.shtml#h. Accessed October, 2012.

difference from deep storms originating over the Pacific Ocean; an outbreak of very cold, Arctic air originating over Canada; or air pressure differences between the Coast Range and central Idaho.

Idaho County and the entire region are at increased risk to wildfires during high wind events. Ignitions can occur from a variety of sources including downed power lines, lightning, or arson. Once ignited, only wildfire mitigation efforts around the community and scattered homes will assist firefighters in controlling a blaze. Details about wildfire mitigation are discussed in the wildland fire annexes of this Multi - Hazard Mitigation Plan.

A tornado is formed by the turbulent mixing of layers of air with contrasting temperature, moisture, density, and wind flow. This mixing accounts for most of the tornadoes occurring in April and May, when cold, dry air from the north or northwest meets warm, moister air moving up from the south. If this scenario was to occur and a major tornado was to strike a populated area in Idaho County, damage could be widespread. Businesses could be forced to close for an extended period, and routine services such as telephone or power could be disrupted. The National Weather Service defines a tornado as a violently rotating column of air that contacts the ground; tornados usually develop from severe thunderstorms.[57] Areas most vulnerable to tornado are those subject to severe thunderstorms or those with a recurrence rate of 5 percent or greater, meaning the County experiences one damaging severe thunderstorm event at least once every 20 years.

According to the Tornado Project[58] and the National Climatic Data Center[59], there were 2 reports of tornadoes in Idaho County between 1880 and 2011. They occurred in April 1979 (F0) and October 2010 (F0). No injuries or deaths were reported as a result of these events.

Drought is a condition of climatic dryness that is severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life systems. Nearly all areas of the State are vulnerable to drought. In every drought, agriculture is adversely impacted, especially in non-irrigated areas such as the dry land farms and rangelands in Idaho County. Droughts impact individuals (farm owners, tenants, and farm laborers), the agricultural industry, and other agriculture-related sectors.

The severity of drought is measured by the Palmer Index in a range of 4 (extremely wet) to -4 (extremely dry). The Palmer Index incorporates temperature, precipitation, evaporation and transpiration, runoff and soil moisture when designating the degree of drought.[60]

---

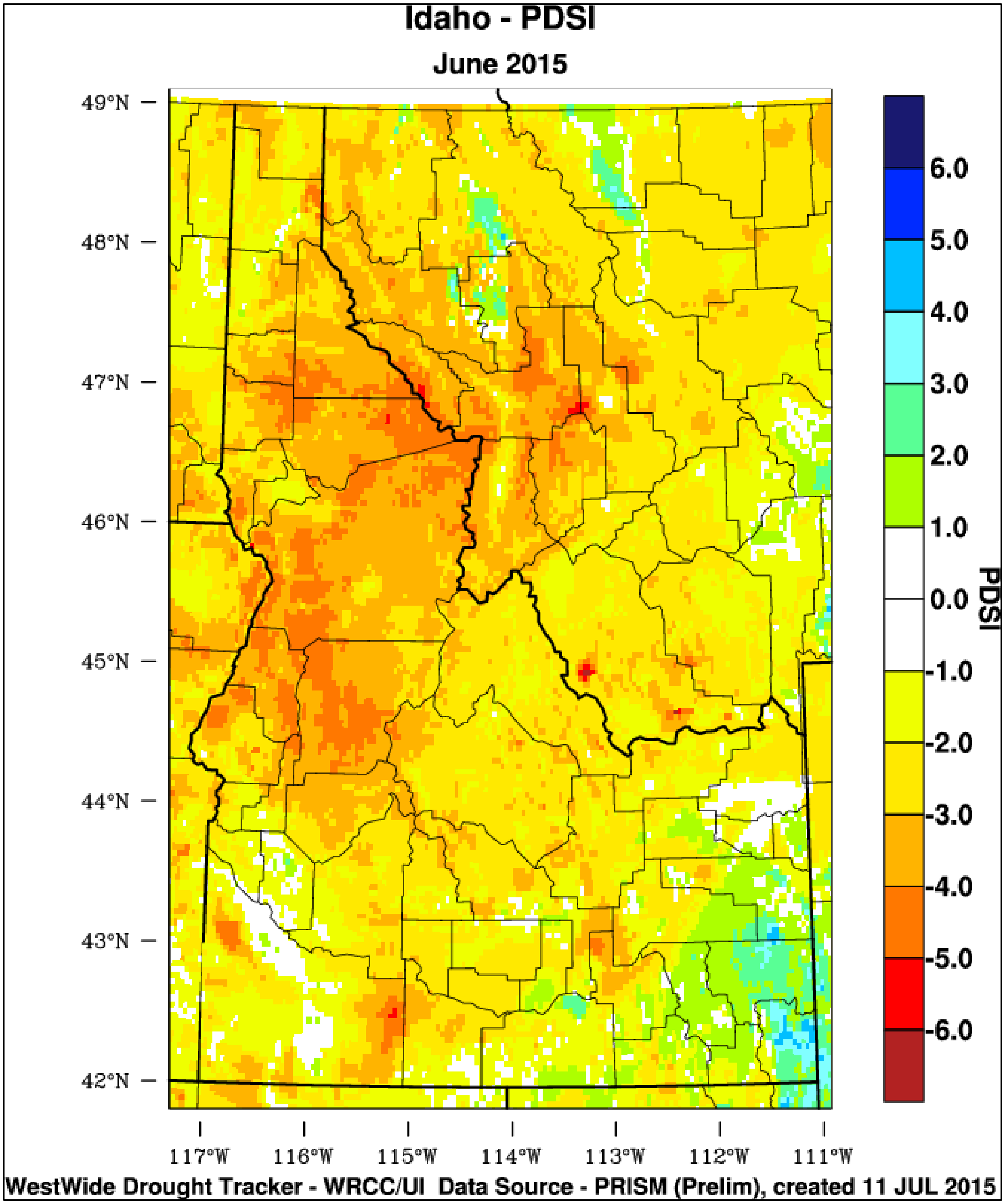
[57] http://www.noaawatch.gov/themes/severe.php. Accessed October, 2012

[58] Tornado Project. 1999. St. Johnsbury, Vermont. Available online at http://www.tornadoproject.com/.

[59] National Climatic Data Center. 2010. *Storm Events Database*. NOAA Satellite and Information Service. U.S. Department of Commerce. Available online at http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms.

[60] "Drought Monitoring". National Weather Service Climate Prediction Center. NOAA. February 2011. Available online at http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml.

Figure 7.6. U.S. WestWide Drought Tracker, July 2015.[61]



[61] WestWideDroughtTracker. Available online at: http://www.wrcc.dri.edu/wwdt/index.php?region=id. Accessed May, 2015.

Drought affects water levels for use by industry, agriculture, and individual consumers. Water shortages affect firefighting capabilities through reduced flows and pressures. Drought also affects power production. Much of Idaho's power is produced by hydro-electric dams. When water levels drop, electric companies cannot produce enough power to meet demand and are forced to buy electricity from other sources. Oftentimes, drought is accompanied by extreme heat. When temperatures reach 90 degrees and above, people are vulnerable to sunstroke, heat cramps, and heat exhaustion. Pets and livestock are also vulnerable to heat-related injuries. Crops can be vulnerable as well. In the past Idaho droughts, crop yields were significantly lessened. Drought increases the danger of wildland fires. In Idaho County, fires in rangeland areas are particularly dangerous due to typically high rates of spread and the scattered nature of structures and infrastructure.

Local Event History

January 1963 – Highway 12 Avalanches

Snow slides and avalanche forced closing of US Highway 12 from Kooskia to the Montana state line. A big snow slide at Squaw Creek reduced traffic flow to one lane. Three other slides were reported between Bald Mountain and the state line.

January 1969 – Severe Winter Weather

Sixteen snow slides were reported in North Idaho closing many highways. An ice jam formed on the Clearwater River near Kamiah. Flights were canceled in Lewiston due to the weather conditions. A section of railroad washed out and restricted motor vehicle travel was reported due to slides. Most schools were closed.

Elk City was isolated because the South Fork of the Clearwater River covered part of State Highway 14. Highway 12 from Lowell to Montana was closed due to slides and avalanche conditions. Blizzard conditions persisted.

January 1982 – Highway 12 Avalanches

Four motorists were trapped for three days between separate avalanches on US Highway 12 along the Lochsa River. One couple was found about 10 miles east of Lowell. They had written a will during their dilemma thinking they would not make it. The other couple was found about 20 miles west of Powell.

January 1989 – Heavy Snow Fall & Avalanches

A large storm ripped through north central Idaho creating hazardous road conditions after it dumped several inches of snow mixed with high winds. Six inches of snow fell in six hours in Grangeville. Highway 95 was closed between Grangeville and Cottonwood. Many schools were closed due to heavy snow. Highway 12 was closed due to four avalanches in a three mile stretch.

January 2008 – Highway 12 Avalanches

A series of four avalanches forced a fifteen day closure of U.S. 12 between Lolo Pass and Lowell and stranded a dozen semi-trucks/trailers. Initially, the semi-trucks were stranded on both sides of the avalanche because they were unable to turn around on the two-lane highway that follows the Lochsa River. One of the avalanches pushed a loaded lumber truck into the Lochsa River. Heavy snow in the region made slopes along the highway extremely unstable and removal of the avalanches very difficult.

June 1995 – Heavy Rains

Heavy rains caused mud slides to close U.S. Highway 95 south of Riggins. $500,000 in property damages was reported.

August 1984 – Drought

A disaster declaration was made in Idaho County for crop damage due to drought and a hailstorm in August.

August 2005 – Thunderstorm & Wind

Strong summer storm brought both severe winds and hail to Idaho County. The bulk of the damage occurred from Grangeville to Fenn. Four power poles were knocked down with hail reported as large as 1.25 inches. Wind gusts measured to 70 mph caused a roof to be ripped off a barn, which then collapsed on farm equipment. The roof was also ripped off the Grangeville Public Works building. Extensive crop damage was also reported on the Camas Prairie; however, only $13,000 in property damage was reported.

November 2006 – High Winds

The weather station at the Grangeville Airport recorded sustained winds of 48 mph with gusts to 66 mph at 300 am PST. Strong southerly winds caused damage to signs, trees, and roofs on businesses with power outages reported in the Grangeville area. Significant damage occurred to the Grangeville Highway District's Quonset structure which lost a portion of its corrugated metal roof. Approximately $60,000 in property damages was reported.

July 1995 – Hail

Several severe thunderstorms moved through the state of Idaho. One thunderstorm in Northern Idaho produced hail .75 inch to 1.50 inches in diameter and high winds that downed power lines and trees in Nez Perce, Lewis, Latah, Shoshone, and Idaho Counties. One inch hail fell near Cottonwood and 1.50 inches hail fell at near Grangeville. This storm damaged the wheat and barley crops at a 100 percent loss in the Cottonwood area. Just south of Cottonwood trees were uprooted and the roof of an apartment building was torn off causing extensive property damage. This area also suffered a power outage. Winds at Fenn and Cottonwood shattered windows and hail dented automobiles.

Probability of Future Occurrence

The probability of Idaho County experiencing a severe weather event on an annual basis is very high.

Extreme cold, snow accumulation, and wind events are common occurrences between November and March. Major winter storms are expected at least twice each year during the winter season; however, these weather patterns rarely last more than a few days. The mountainous areas of Idaho County receive several feet of snowfall each year. Severe ice storms also occur in Idaho County during the winter months. The probability of this type of event is moderate to high annually.

Wind events are also common in Idaho County and can occur throughout the year. Wind is often associated with winter storms during the winter and thunderstorms during the warmer months, but can also occur without additional storm influences. Significant wind events are expected 3-5 times annually.

Several major thunderstorms are expected in Idaho County each year between April and September; however, these types of events rarely cause serious damage.

Idaho County has a moderate probability of experiencing a damaging hail storm in any given year. These types of events most frequently occur in the spring, but can occur throughout the summer as well.

Tornadoes are relatively rare, but the conditions for a funnel cloud to form are reported in Idaho County several times each year. Nevertheless, based on the historical record of tornadoes in this area, the probability of a small tornado occurring in Idaho County is low. The probability of a higher magnitude tornado occurring in this area is extremely low.

The Idaho Department of Water Resources reports that meteorological drought conditions (a period of low precipitation) existed in the State approximately 30% of the time during the period 1931-1982. Principal drought in Idaho, indicated by stream flow records, occurred during 1929-41, 1944-45, 1959-61, 1977, and 1987-92.[62] The probability of Idaho County experiencing a major long term drought in any given year is low to moderate. While Idaho County does experience droughts, on the whole, they are mild and do not cause long term damage. The impacts of drought on the agricultural sector are mitigated by the availability of irrigation water.

Impacts of Severe Weather Events

Winter storms with heavy snow, high winds, and/or extreme cold can have a considerable impact on Idaho County, particularly in the mountainous areas to the north. However, most residents are well accustomed to the severe winter conditions in this part of Idaho. Structures in Idaho communities are generally built to handle the snowload for the area; thus, severe damages from winter storms are rarely reported.

Power outages and unplowed roads are a frequent occurrence throughout many parts of the County, but most residents are prepared to handle the temporary inconvenience. Blowing and drifting snow can often be difficult for crews to keep roads open. Snow loads on roofs, ice-slides off of roofs onto vehicles or other buildings, and damaged frozen pipes are also potential hazards associated with winter weather.

[62] Idaho Department of Water Resources. 2010. Idaho Drought Emergency Declarations. Available online at http://www.idwr.idaho.gov/News/drought/drought.htm.

These events represent a significant hazard to public health and safety, a substantial disruption of economic activity, and a constant threat to structures during the winter months.

Idaho County has experienced several “ice storms” in recent memory. The freezing rain from an ice storm covers everything with a heavy layer of ice that can cause hazardous road conditions resulting in numerous accidents. Trees have been heavily damaged as branches break from the weight of the ice. The weight of the ice can also snap power lines and bring down utility poles. The loss of power during the winter months can last from a few hours to a few days and is particularly dangerous for those relying on electrical heat. The loss of a heat source can cause hypothermia, frost bite, or even death and can also lead to damages caused by frozen pipes.

Many types of severe weather events tend to impact transportation routes and related infrastructure, especially snow and thunderstorms. Numerous traffic accidents occur along Highway 95 and other primary routes each year, but are particularly common during the winter months due to ice and snowpack as well as poor visibility.

Wind usually accompanies snow storms in Idaho County; thus, large accumulations are not common as much of the snow is blown away. Commonly, heavy drifting is the cause of disruptions to normal commuting activities (delays and inability to plow roads and driveways). High wind events during the spring and summer months could lead to crop damages as well.

The potential impacts of a severe hail storm in Idaho County include crop damage, downed power lines, downed or damaged trees, broken windows, roof damage, and vehicle damage. Hail storms can, in extreme cases, cause death by exposure. The most common direct impact from ice storms to people is traffic accidents. The highest potential damage from hail storms in Idaho County is the economic loss from crop damage. Even small hail can cause significant damage to young and tender plants and fruit. Trees can also be severely damaged by hail.

So far, tornadoes have not had any serious impacts on Idaho County residents. Minor damages may occur as a result of the high winds associated with a tornado.

The impacts of drought are diverse and often ripple through the economy. Thus, impacts are often referred to as either direct or indirect. A loss of yield resulting from drought is a direct or first-order impact of drought. However, the consequences of that impact (for example, loss of income, farm foreclosures, and government relief programs) are secondary or even tertiary impacts. The impacts of drought in Idaho County can be classified into one of three principal types: economic, environmental, and social. Economic impacts range from; direct losses in the broad agricultural and agriculturally related sectors (including forestry and fishing), to losses in recreation, transportation, banking, and energy sectors. Other economic impacts would include added unemployment and loss of revenue to local, state, and federal government. Environmental losses include damages to plant and animal species, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; and soil erosion. These losses are difficult to quantify, but growing public awareness and concern for environmental quality has forced public officials to focus greater attention on them. Social impacts mainly involve public safety, health, conflicts between water users, and inequities in the distribution of impacts and disaster relief programs. As with all natural hazards, the economic impacts of drought are highly variable within and between economic sectors and geographic regions, producing a complex assortment of winners and losers with the occurrence of each disaster.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Idaho County. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, due to the lack of significant topographic features, the wind tends to blow much of the snow accumulation away. Snow plowing in Idaho County occurs from a variety of departments and agencies. The state highways are maintained by the State of Idaho. Plowing of county roads is done by the local highway districts and the road departments of the individual cities. Idaho County has developed a pre-determined list of critical routes in order to prioritize the plowing of arterials and other main access routes. Private landowners are responsible for maintaining their own driveways or other private roads.

Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on Idaho County residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. More rural parts of the County are sometimes better prepared to deal with power outages for a few days due to the frequent occurrence of such events; however, prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms do occur within Idaho affecting all counties, but usually are localized events. Their impacts are fairly limited and do not significantly affect the communities enough to declare a disaster. The loss potential from flooding caused by severe thunderstorms can be significant in Idaho County.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property as well as to the extensive agricultural development in Idaho County. Potential losses to agriculture can be disastrous. They can also be very localized; thus, individual farmers can have significant losses, but the event may not drastically affect the economy of the County. Furthermore, crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Federal and state aid is available for County's with declared hail disasters resulting in significant loss to local farmers as well as the regional economy. Homeowners in Idaho County rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Idaho County due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community has a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)
- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 5,505 parcels with improvements in unincorporated Idaho County with a total value of approximately $436,623,570. Using the criteria outlined above an estimate of the impact of high winds on the County has been made. The potential wind and tornado damage to all buildings is estimated at approximately $13,086,810. The estimated damage to roofs is approximately $825,000.

Although the financial impacts of drought can be substantial and extended, accurately quantifying these impacts is problematic. Drought typically does not cause direct losses to structures or infrastructure, although the forest and rangelands in Idaho County are at increased risk to wildfires as a result of drought conditions. Idaho County has experienced numerous large wildland fires in the past two decades resulting in thousands of acres of forest and rangeland burned and numerous structures and livelihoods lost. The resulting smoke and road closures often affect local citizens as well have impacts on the economy.

The tangible losses are most clearly seen in the agriculture and livestock ranching sectors of the County's economy. Dry land agriculture can be negatively impacted by drought conditions due to reduced yields and limited crop diversification. Livestock ranchers may be forced to recalculate range carrying capacities, change field rotations, and provide supplemental feed for livestock. Reduced hydroelectric power production can also result from decreased water levels in the area reservoirs.

Individual Community Assessments

City of Grangeville

Severe Weather Profile

The city of Grangeville does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in Grangeville on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Grangeville. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city's public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in Grangeville to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within

Grangeville. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in Grangeville rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Grangeville due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)
- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 1,367 parcels with improvements in Grangeville with a total value of approximately $132,523,393. Using the criteria outlined above, an estimate of the impact of high winds in Grangeville has been made using the average value of a structure in Grangeville. The potential wind and tornado damage to all buildings is estimated at approximately $3,977,656. The estimated damage to roofs is approximately $204,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

City of Ferdinand

Severe Weather Profile

The city of Ferdinand does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in Ferdinand on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Ferdinand. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city's public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in Ferdinand to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within Ferdinand. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in Ferdinand rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Ferdinand due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)
- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 82 parcels with improvements in Ferdinand with a total value of approximately $5,981,975. Using the criteria outlined above, an estimate of the impact of high winds in Ferdinand has been made using the average value of a structure in Ferdinand. The potential wind and tornado damage to all buildings is estimated at approximately $182,378. The estimated damage to roofs is approximately $12,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

City of Cottonwood

Severe Weather Profile

The city of Cottonwood does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in Cottonwood on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Cottonwood. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city's public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in Cottonwood to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within Cottonwood. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in Cottonwood rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Cottonwood due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)

- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 398 parcels with improvements in Cottonwood with a total value of approximately $36,600,099. Using the criteria outlined above, an estimate of the impact of high winds in Cottonwood has been made using the average value of a structure in Cottonwood. The potential wind and tornado damage to all buildings is estimated at approximately $1,103,520. The estimated damage to roofs is approximately $60,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

City of Riggins

Severe Weather Profile

The city of Riggins does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in Riggins on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Riggins. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city’s public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in Riggins to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within Riggins. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in Riggins rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Riggins due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)
- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 214 parcels with improvements in Riggins with a total value of approximately $22,865,562. Using the criteria outlined above, an estimate of the impact of high winds in Cottonwood has been made using the average value of a structure in Cottonwood. The potential wind and tornado damage to all buildings is estimated at approximately $641,088. The estimated damage to roofs is approximately $33,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

City of Stites

Severe Weather Profile

The city of Stites does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in Stites on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Stites. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city's public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in Stites to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within Stites. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in Stites rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Stites due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)
- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 86 parcels with improvements in Stites with a total value of approximately $4,068,185. Using the criteria outlined above, an estimate of the impact of high winds in Cottonwood has been made using the average value of a structure in Stites. The potential wind and tornado damage to all buildings is estimated at approximately $141,912. The estimated damage to roofs is approximately $12,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

City of Kamiah

Severe Weather Profile

The city of Kamiah does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in Kamiah on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Kamiah. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city's public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in Kamiah to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within Kamiah. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in Kamiah rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Kamiah due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)
- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 38 parcels with improvements in Kamiah with a total value of approximately $3,870,456. Using the criteria outlined above, an estimate of the impact of high winds in Cottonwood has been made using the average value of a structure in Kamiah. The potential wind and tornado damage to all buildings is estimated at approximately $101,854. The estimated damage to roofs is approximately $6,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

City of Kooskia

Severe Weather Profile

The city of Kooskia does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in Kooskia on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in Kooskia. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city's public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in Kooskia to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within Kooskia. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in Kooskia rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in Kooskia due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)
- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 255 parcels with improvements in Kooskia with a total value of approximately $15,124,330. Using the criteria outlined above, an estimate of the impact of high winds in Cottonwood has been made using the average value of a structure in Kooskia. The potential wind and tornado damage to all buildings is estimated at approximately $474,488. The estimated damage to roofs is approximately $39,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

City of White Bird

Severe Weather Profile

The city of White Bird does not have any differing levels of risk associated with this hazard than Idaho County as a whole.

Probability of Future Occurrence

The probability of a severe weather event occurring in White Bird on an annual basis is very high.

Impacts of Severe Weather Events

The impacts of severe weather events to the community are usually minimal and are the same as those described for Idaho County as a whole; however, their ability to respond to this hazard varies greatly. No specific jurisdictions or special districts were identified as having differing issues or levels of risk associated with this hazard unless specifically referenced.

Value of Resources at Risk

It is difficult to estimate the cost of potential winter storm damages to structures and the economy in White Bird. Damage to roofs by heavy snow accumulations depends on the moisture content of the snow and the structural characteristics of the buildings. In general, snow in this region tends to have low moisture content because of the low temperatures and arid environment. Additionally, snow rarely accumulates for long periods of time due to regular wind events. Frozen water pipes are the most common damage to residential and business structures. Older homes tend to be at a higher risk to frozen water pipes than newer ones. Snow plowing within the city limits is accomplished by the city's public works department. Private landowners are responsible for maintaining their own driveways or other private roads. Utility supplies are impacted during severe winter storms as power is lost on a regional basis. This has a two-fold impact on residents as not only is power cut to homes and businesses, but primary heating is lost for many residents. Gas furnaces and wood stoves supplement electrical heating, but with wood heating the senior population is at a disadvantage. Emergency response to severe winter storms includes site visits by police or fire department personnel, opening of shelters, or assistance with shopping, medical attention, and communications. The economic losses caused by severe winter storms may frequently be greater than structural damages. Employees may not be able to travel to work for several days and businesses may not open. Damages are seen in the form of structural repair and loss of economic activity. Idaho County schools are occasionally closed during and right after a severe winter storm because of cold temperatures and snow covered roads.

Thunderstorms are not likely to be severe enough in White Bird to cause significant damages. However, the loss potential from flooding results from severe thunderstorms could be significant.

Although the financial impacts of hail can be substantial and extended, accurately quantifying these impacts is problematic. Hail typically causes direct losses to structures and other personal property within White Bird. The most significant losses are most clearly seen in the agriculture sectors of the economy. Potential losses to agriculture can be disastrous. Crop damage from hail will also be different depending on the time of year and the type of crop. Most farmers carry insurance on their crops to help mitigate the potential financial loss resulting from a localized hail storm. Homeowners in White Bird rarely incur severe damage to structures (roofs); however, hail damage to vehicles is not uncommon. The damage to vehicles is difficult to estimate because the number of vehicles impacted by a specific ice storm is unknown. Additionally, most hail damage records are kept by various insurance agencies.

It is difficult to estimate potential losses in White Bird due to windstorms and tornadoes. Construction throughout the County has been implemented in the presence of high wind events, and therefore, the community is at a higher level of preparedness to high wind events than many other areas experiencing lower average wind speeds.

We have estimated losses based on wind and tornado damage as follows:

- 3% of the buildings damaged causing 50% of value loss (loss could be from downed or damaged trees, damaged outbuildings, damaged fences/poles, damage to siding, damaged landscaping etc.)

- 5% of the buildings received damage to roof (requiring replacement of roof equaling $3,000)

Damages associated with sensitive receptor irritation have not been estimated. We have also not estimated the potential for a large scale wildfire event associated with high winds. Based on the data provided by the County, there are 55 parcels with improvements in White Bird with a total value of approximately $3,149,810. Using the criteria outlined above, an estimate of the impact of high winds in Cottonwood has been made using the average value of a structure in White Bird. The potential wind and tornado damage to all buildings is estimated at approximately $114,538. The estimated damage to roofs is approximately $9,000.

Power failure often accompanies severe storms. Prolonged failure, especially during cold winter temperatures can have disastrous effects. All communities should be prepared to deal with power failures. Community shelters equipped with alternative power sources will help local residents stay warm and prepare food. A community-based system for monitoring and assisting elderly or disabled residents should also be developed. All households should maintain survival kits that include warm blankets, flashlights, extra batteries, nonperishable food items, and clean drinking water.

Chapter 8

Wildland Fire Hazard Profile

IN THIS SECTION:

- Regional and Local Hazard Profile
- Jurisdictional Risk and Vulnerability Assessment
- Individual Community Assessments

Chapter 8 Hazard Risk Assessment

This Page Intentionally Left Blank

Chapter 8 – Wildland Fire

Regional and Local Hazard Profiles

The original Idaho County Fire Mitigation Plan was completed and adopted in 2005 and was updated in 2009. The wildland fire sections of this plan will serve as the Idaho County Community Wildfire Protection Plan.

An informed discussion of fire mitigation is not complete until basic concepts that govern fire behavior are understood. In the broadest sense, wildland fire behavior describes how fires burn; the manner in which fuels ignite, how flames develop and how fire spreads across the landscape. The three major physical components that determine fire behavior are the fuels supporting the fire, the topography in which the fire is burning, and the weather and atmospheric conditions during a fire event. At the landscape level, both topography and weather are beyond our control. We are powerless to control winds, temperature, relative humidity, atmospheric instability, slope, aspect, elevation, and landforms. It is beyond our control to alter these conditions, and thus impossible to alter fire behavior through their manipulation. When we attempt to alter how fires burn, we are left with manipulating the third component of the fire environment; fuels which support the fire. By altering fuel loading and fuel continuity across the landscape, we have the best opportunity to control or affect how fires burn.

A brief description of each of the fire environment elements follows in order to illustrate their effect on fire behavior.

Weather

Weather conditions contribute significantly to determining fire behavior. Wind, moisture, temperature, and relative humidity ultimately determine the rates at which fuels dry and vegetation cures, and whether fuel conditions become dry enough to sustain an ignition. Once conditions are capable of sustaining a fire, atmospheric stability and wind speed and direction can have a significant effect on fire behavior. Winds fan fires with oxygen, increasing the rate at which fire spreads across the landscape. Weather is the most unpredictable component governing fire behavior, constantly changing in time and across the landscape.

Topography

Fires burning in similar fuel types, will burn differently under varying topographic conditions. Topography alters heat transfer and localized weather conditions, which in turn influences vegetative growth and resulting fuels. Changes in slope and aspect can have significant influences on how fires burn. Generally speaking, north slopes tend to be cooler, wetter, more productive sites. This can lead to heavy fuel accumulations, with high fuel moistures, later curing of fuels, and lower rates of spread. In contrast, south and west slopes tend to receive more direct sun, and thus have the highest temperatures, lowest soil and fuel moistures, and lightest fuels. The combination of light fuels and dry sites leads to fires that typically display the highest rates of spread. These slopes also tend to be on the windward side of mountains. Thus these slopes tend to be "available to burn" a greater portion of the year.

Slope also plays a significant role in fire spread, by allowing preheating of fuels upslope of the burning fire. As slope increases, rate of spread and flame lengths tend to increase. Therefore, we can expect the fastest rates of spread on steep, warm south and west slopes with fuels that are exposed to the wind.

Fuels

Fuel is any material that can ignite and burn. Fuels describe any organic material, dead or alive, found in the fire environment. Grasses, brush, branches, logs, logging slash, forest floor litter, conifer needles, and buildings are all examples. The physical properties and characteristics of fuels govern how fires burn. Fuel loading, size and shape, moisture content, and continuity and arrangement all have an effect on fire behavior. Generally speaking, the smaller and finer the fuels, the faster the potential rate of fire spread. Small fuels such as grass, needle litter and other fuels less than a quarter inch in diameter are most responsible for fire spread. In fact, "fine" fuels, with high surface to volume ratios, are considered the primary carriers of surface fire. This is apparent to anyone who has ever witnessed the speed at which grass fires burn. As fuel size increases, the rate of spread tends to decrease due to a decrease in the surface to volume ratio. Fires in large fuels generally burn at a slower rate, but release much more energy and burn with much greater intensity. This increased energy release, or intensity, makes these fires more difficult to control. Thus, it is much easier to control a fire burning in grass than to control a fire burning in timber.

When burning under a forest canopy, the increased intensities can lead to torching (single trees becoming completely involved) and potential development of crown fires. That is, they release much more energy. Fuels are found in combinations of types, amounts, sizes, shapes, and arrangements. It is the unique combination of these factors, along with the topography and weather, which determines how fires will burn.

The study of fire behavior recognizes the dramatic and often-unexpected effect small changes in any single component have on how fires burn. It is impossible to speak in specific terms when predicting how a fire will burn under any given set of conditions. However, through countless observations and repeated research, some of the principles that govern fire behavior have been identified and are recognized.

Wildfire Extent Profile

Across the west, wildfires have been increasing in extent and cost of control. Data summaries for 2003 through 2014 are provided and demonstrate the variability of the frequency and extent of wildfires nationally.

Table 8.1. Statistical Highlights of Wildfires from 2004 -2014 Nationally.											
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Number of Fires	77,534	66,753	96,385	85,705	78,979	78,792	71,971	74,126	67,774	47,579	63,212
10-year Average ending with indicated year	100,466	89,859	87,788	80,125	79,918	78,549	76,521	80,465	74,912	74,560	73,128
Acres Burned (million acres)	6.8	8.7	9.9	9.3	5.3	5.9	3.4	8.7	9.2	4.3	3.6
10-year Average ending with indicated year (million acres)	4.9	6.1	6.5	7.0	6.9	6.9	6.5	7.0	7.3	7.2	6.8
Structures Destroyed	1,095	--	--	--	--	--	788	5,246	4,244	2,135	1,953
Estimated Cost of Fire Suppression (Federal agencies only)	$1.0 billion	$9.8 million	$1.93 billion	$1.84 billion	$1.85 billion	$1.24 billion	$1.13 billion	$1.73 billion	$1.9 billion	$1.7 billion	$1.5 billion

The National Interagency Fire Center and the National Incident Coordination Center maintains records of fire costs, extent, and related data for the entire nation. Tables 8.2 and 8.3 summarize some of the relevant wildland fire data for the nation and some trends that are likely to continue into the future unless targeted fire mitigation efforts are implemented and maintained. According to these data, the total number of fires is trending downward while the total number of acres burned is trending upward. Since 1980 there has been a significant increase in the number of acres burned.[63] In 2014, Washington was second behind California for the highest structure loss per state, with 342 residences, one commercial and 175 outbuildings destroyed during the 2014 fire season.[64]

Table 8.2. Summary of National Ignitions and Acres Burned Annually (1980-2014).					
Year	**Fires**	**Acres**	**Year**	**Fires**	**Acres**
2014	63,212	3,595,613	**1996**	115,025	6,701,390
2013	47,579	4,319,546	**1995**	130,019	2,315,730
2012	67,774	9,326,238	**1994**	114,049	4,724,014
2011	74,126	8,711,367	**1993**	97,031	2,310,420
2010	71,971	3,422,724	**1992**	103,830	2,457,665
2009	78,792	5,921,786	**1991**	116,953	2,237,714
2008	68,594	4,723,810	**1990**	122,763	5,452,874
2007	85,822	9,321,326	**1989**	121,714	3,261,732
2006	96,385	9,873,745	**1988**	154,573	7,398,889
2005	66,753	8,689,389	**1987**	143,877	4,152,575
2004	77,534	6,790,692	**1986**	139,980	3,308,133
2003	85,943	4,918,088	**1985**	133,840	4,434,748

[63] National Interagency Fire Center. 2015. Available online at http://www.nifc.gov/.

[64] National Interagency Fire Center. Wildland Fire Summary and Statistics Annual Report 2014. Available online at http://www.predictiveservices.nifc.gov/intelligence/2014_Statssumm/annual_report_2014.pdf.

2002	88,458	6,937,584	**1984**	118,636	2,266,134
2001	84,079	3,555,138	**1983**	161,649	5,080,553
2000	122,827	8,422,237	**1982**	174,755	2,382,036
1999	93,702	5,661,976	**1981**	249,370	4,814,206
1998	81,043	2,329,709	**1980**	234,892	5,260,825
1997	89,517	3,672,616			

These statistics are based on end-of-year reports compiled by all wildland fire agencies after each fire season. The agencies include: Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service, Forest Service, and all state agencies.

Wildfire Hazard Assessment

Idaho County was analyzed using a variety of models, managed on a Geographic Information System (GIS) system. Physical features of the region including roads, streams, soils, elevation, and remotely sensed images were represented by data layers. Field visits were conducted by specialists from Northwest Management, Inc. and others. Discussions with area residents and local fire suppression professionals augmented field visits and provided insights into forest health issues and treatment options. This information was analyzed and combined to develop an objective assessment of wildland fire risk in the region.

Historic Fire Regime

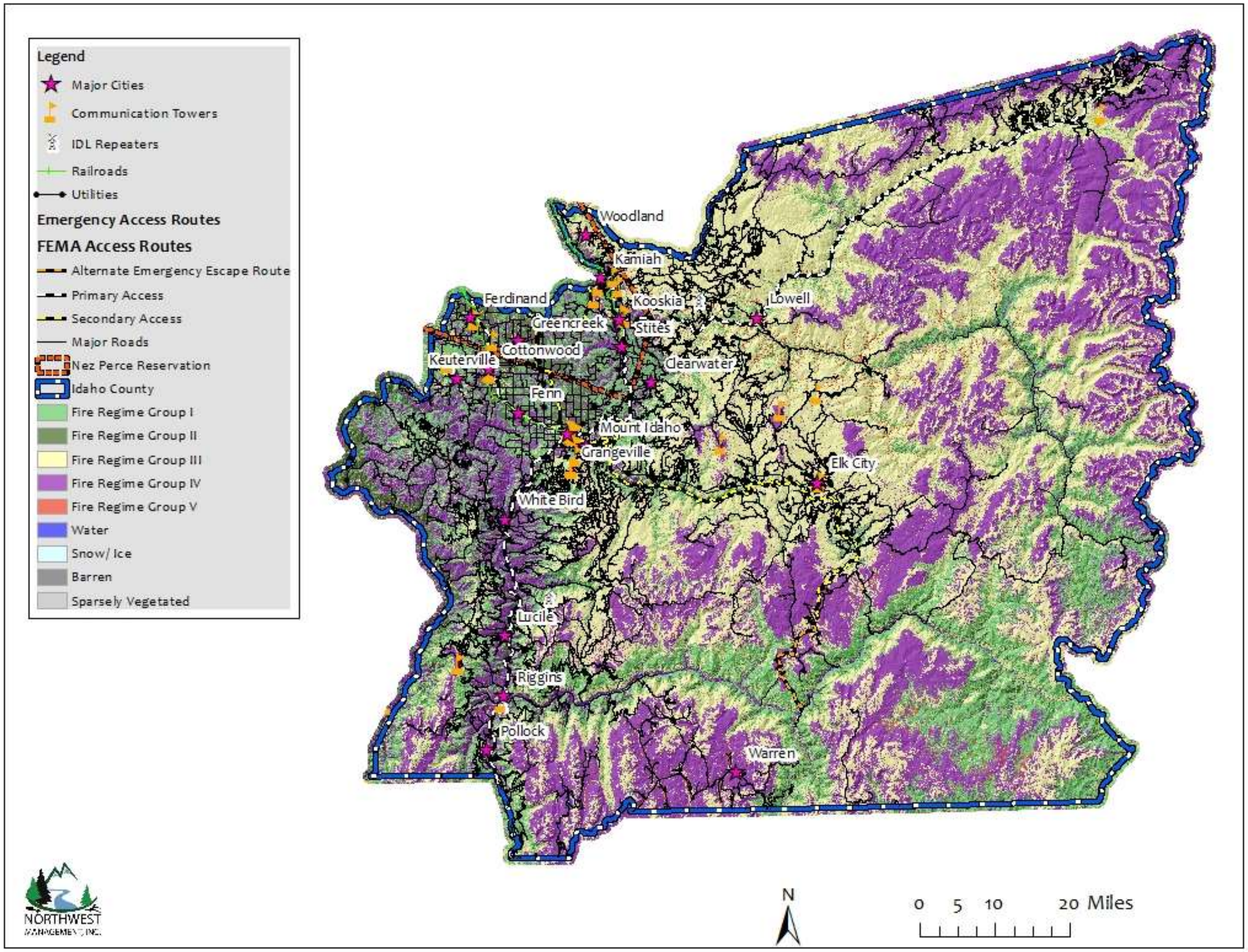
Historical variability in fire regime is a conservative indicator of ecosystem sustainability, and thus, understanding the natural role of fire in ecosystems is necessary for proper fire management. Fire is one of the dominant processes in terrestrial systems that constrain vegetation patterns, habitats, and ultimately, species composition. Land managers need to understand historical fire regimes, the fire return interval (frequency) and fire severity prior to settlement by Euro-Americans, to be able to define ecologically appropriate goals and objectives for an area. Moreover, managers need spatially explicit knowledge of how historical fire regimes vary across the landscape.

Many ecological assessments are enhanced by the characterization of the historical range of variability which helps managers understand: (1) how the driving ecosystem processes vary from site to site; (2) how these processes affected ecosystems in the past; and (3) how these processes might affect the ecosystems of today and the future. Historical fire regimes are a critical component for characterizing the historical range of variability in fire-adapted ecosystems. Furthermore, understanding ecosystem departures provides the necessary context for managing sustainable ecosystems. Land managers need to understand how ecosystem processes and functions have changed prior to developing strategies to maintain or restore sustainable systems. In addition, the concept of departure is a key factor for assessing risks to ecosystem components. For example, the departure from historical fire regimes may serve as a useful proxy for the potential of severe fire effects from an ecological perspective.

Table 8.3. Historic Fire Regimes in Idaho County.			
Historic Fire Regime	**Description**	**Acres**	**Percent of Total**
Fire Regime Group I	<= 35 Year Fire Return Interval, Low and Mixed Severity	1,038,279	19%
Fire Regime Group II	<= 35 Year Fire Return Interval, Replacement Severity	175,695	3%
Fire Regime Group III	35 - 200 Year Fire Return Interval, Low and Mixed Severity	2,303,953	42%
Fire Regime Group IV	35 - 200 Year Fire Return Interval, Replacement Severity	1,846,705	34%
Fire Regime Group V	> 200 Year Fire Return Interval, Any Severity	49,621	1%
Water	Water	14,220	<1%
Snow / Ice	Snow / Ice	1,091	<1%
Barren	Barren	1,812	<1%
Sparsely Vegetated	Sparsely Vegetated	6,176	<1%
	Total	**5,437,553**	**100%**

Over three quarters of the County falls within the Fire Regime Groups III and IV. This means that a majority of the fuel types within the County burn every 35 – 200 years with low and mixed severity to replacement severity. The long return interval is typical of the forest communities at higher altitudes. Nearly twenty percent of the County can expect a fire return interval of 35 years or less with a low to mixed severity. The ratio of grass to shrubs generally determines how often this fuel type burns and how severe the burn is. More grass increases the frequency but reduces the intensity, while more shrubs decrease the frequency but increases the intensity. Fire Regime Group I occurs primarily in the canyons of the major river corridors throughout the county.

Figure 8.1. Historic Fire Regime for Idaho County.



Fire Regime Condition Class

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning.[65, 66] Coarse scale definitions for historic fire regimes have been developed by Hardy et al[67] and Schmidt et al[68] and interpreted for fire and fuels management by Hann and Bunnell.

A fire regime condition class (FRCC) is a classification of the amount of departure from the historic regime.[69] The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime.[70,71] The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

Over 63% of Idaho County is moderately departed from the natural regime. This is likely attributed to invasive species moving in after a disturbance. Examples of disturbances would be; fire, grazing, roads, and recreation. In most scenarios, the more departed an area is from its natural fire regime, the higher the wildfire potential; however, this is not true 100% of the time.

---

[65] Agee, J. K. Fire Ecology of the Pacific Northwest forests. Oregon: Island Press. 1993.

[66] Brown. J. K. "Fire regimes and their relevance to ecosystem management." *Proceedings of Society of American Foresters National Convention*. Society of American Foresters. Washington, D.C. 1995. Pp 171-178.

[67] Hardy, C. C., et al. *"Spatial data for national fire planning and fuel management."* International Journal of Wildland Fire. 2001. Pp 353-372.

[68] Schmidt, K. M., et al. *"Development of coarse scale spatial data for wildland fire and fuel management."* General Technical Report, RMRS-GTR-87. U.S. Department of Agriculture, Forest Service. Rocky Mountain Research Station. Fort Collins, Colorado. 2002.

[69] Hann, W. J. and D. L. Bunnell. "Fire and land management planning and implementation across multiple scales." International Journal of Wildland Fire. 2001. Pp 389-403.

[70] Hardy, C. C., et al. *"Spatial data for national fire planning and fuel management."* International Journal of Wildland Fire. 2001. Pp 353-372.

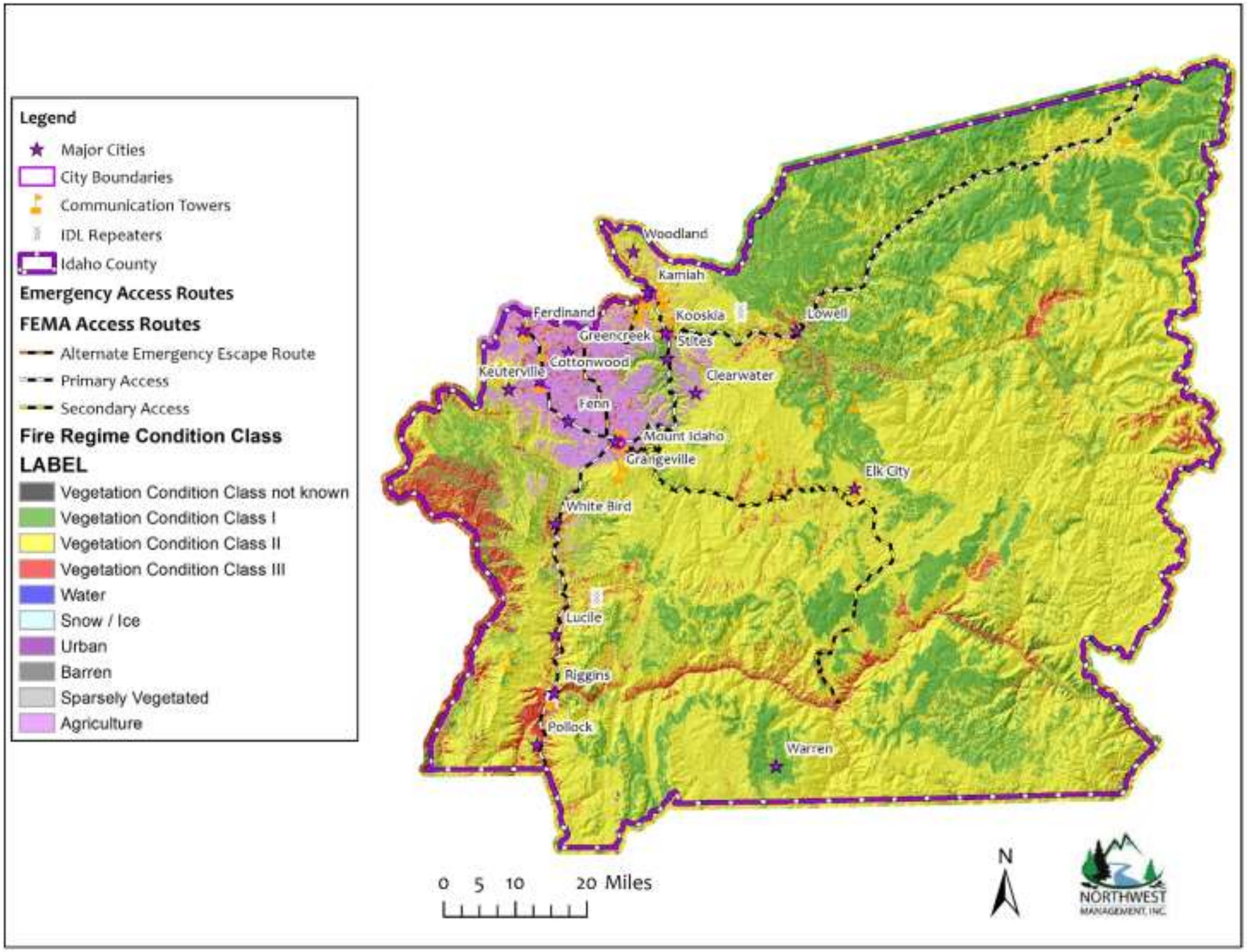
[71] Schmidt, K. M., et al. *"Development of coarse scale spatial data for wildland fire and fuel management."* General Technical Report, RMRS-GTR-87. U.S. Department of Agriculture, Forest Service. Rocky Mountain Research Station. Fort Collins, Colorado. 2002.

Table 8.4. Fire Regime Condition Class in Idaho County.			
Fire Regime Condition Class	**Description**	**Acres**	**Percent of Total**
Fire Regime Condition Class I	Low Vegetation Departure	1,615,192	30%
Fire Regime Condition Class II	Moderate Vegetation Departure	3,432,498	63%
Fire Regime Condition Class III	High Vegetation Departure	189,229	4%
Water	Water	10,586	<1%
Snow / Ice	Snow / Ice	725	<1%
Urban	Urban	10,321	<1%
Barren	Barren	2,076	<1%
Sparsely Vegetated	Sparsely Vegetated	2,477	<1%
Agriculture	Agriculture	176,621	3%
	Total	5,439,725	**100%**

Several factors have contributed to the changing fire regime in Idaho County including the introduction of invasive plant species and a reduction in widespread grazing as well as more sophisticated, and ultimately more successful, fire suppression techniques and equipment. Introduced species such as *Taeniatherum caput-medusae* (medusahead) and *Bromus tectorum* (cheatgrass) have replaced the native bunchgrasses throughout much of the area. These species create a more continuous vegetative fuel bed, which tends to result in higher rates of fire spread than the native vegetation could sustain. Furthermore, medusahead and cheatgrass are better adapted to disturbed soils; thus, they often outcompete native grass and sagebrush communities once a fire has burned through an area, which further increases their dominance and thus, fire risk.[72] Additionally, livestock grazing has been reduced throughout central Idaho, which traditionally lessened the wildfire risk through the consumption of fine fuels. These factors have resulted in a departure from the historic fire regimes' range of variability. Rangeland fires are occurring more frequently than prior to European settlement of the area. Much of the forested areas of the County have been harvested resulting in a change of stand structure; species, age, and density. This is evident in the red areas shown on the map below depicting a Vegetation Condition Class III.

[72] http://www.fs.fed.us/database/feis/plants/graminoid/brotec/all.html#46. Accessed, October 2012.

Figure 8.2. Fire Regime Condition Class Map for Idaho County.



Wildland-Urban Interface

The wildland-urban interface (WUI) has gained attention through efforts targeted at wildfire mitigation; however, this analysis technique is also useful when considering other hazards because the concept looks at where people and structures are concentrated in any particular region.

A key component in meeting the underlying need for protection of people and structures is the protection and treatment of hazards in the wildland-urban interface. The wildland-urban interface refers to areas where wildland vegetation meets urban developments or where forest fuels meet urban fuels such as houses. The WUI encompasses not only the interface (areas immediately adjacent to urban development), but also the surrounding vegetation and topography. Reducing the hazard in the wildland-urban interface requires the efforts of federal, state, and local agencies and private individuals.[73] "The role of [most] federal agencies in the wildland-urban interface includes wildland firefighting, hazard fuels reduction, cooperative prevention and education, and technical experience. Structural fire protection [during a wildfire] in the wildland-urban interface is [largely] the responsibility of Tribal, state, and local governments".[74] The role of the federal agencies in Idaho County is and will be much more limited. Property owners share a responsibility to protect their residences and businesses and minimize danger by creating defensible areas around them and taking other measures to minimize the risks to their structures.[75] With treatment, a wildland-urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend communities against other hazard risks. In addition, a wildland-urban interface that is properly treated will be less likely to sustain a crown fire that enters or originates within it.[76]

By reducing hazardous fuel loads, ladder fuels, and tree densities, and creating new and reinforcing existing defensible space, landowners can protect the wildland-urban interface, the biological resources of the management area, and adjacent property owners by:

- minimizing the potential of high-severity ground or crown fires entering or leaving the area;
- reducing the potential for firebrands (embers carried by the wind in front of the wildfire) impacting the WUI. Research indicates that flying sparks and embers (firebrands) from a crown

[73] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

[74] USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: http://www.fs.fed.us/r3/sfe/fire/urbanint.html

[75] USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: http://www.fs.fed.us/r3/sfe/fire/urbanint.html

[76] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

fire can ignite additional wildfires as far as 1¼ miles away during periods of extreme fire weather and fire behavior;[77]

- improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

Three wildland-urban interface conditions have been identified (Federal Register 66(3), January 4, 2001) for use in wildfire control efforts. These include the Interface Condition, Intermix Condition, and Occluded Condition. Descriptions of each are as follows:

- **Interface Condition** – a situation where structures abut wildland fuels. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences. The development density for an interface condition is usually 3+ structures per acre;
- **Intermix Condition** – a situation where structures are scattered throughout a wildland area. There is no clear line of demarcation; the wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres; and
- **Occluded Condition** – a situation, normally within a city, where structures abut an island of wildland fuels (park or open space). There is a clear line of demarcation between the structures and the wildland fuels along roads and fences. The development density for an occluded condition is usually similar to that found in the interface condition and the occluded area is usually less than 1,000 acres in size.

In addition to these classifications detailed in the Federal Register, Idaho County has included four additional classifications to augment these categories:

- **Rural Condition** – a situation where the scattered small clusters of structures (ranches, farms, resorts, or summer cabins) are exposed to wildland fuels. There may be miles between these clusters.
- **High Density Urban Areas** – those areas generally identified by the population density consistent with the location of incorporated cities, however, the boundary is not necessarily set by the location of city boundaries or urban growth boundaries; it is set by very high population densities (more than 7-10 structures per acre).
- **Infrastructure Area WUI** – those locations where critical and identified infrastructure is located outside of populated regions and may include high tension power line corridors, critical escape or primary access corridors, municipal watersheds, and areas immediately adjacent to facilities in the wildland such as radio repeater towers.
- **Non-WUI Condition** – a situation where the above definitions do not apply because of a lack of structures in an area or the absence of critical infrastructure. This classification is not considered part of the wildland urban interface.

In summary, the designation of areas by the Idaho County planning committee includes:

- Interface Condition: WUI

[77] McCoy, L. K., et all. Cerro Grand Fire Behavior Narrative. 2001.

- Intermix Condition: WUI
- Occluded Condition: WUI
- Rural Condition: WUI
- High Density Urban Areas: WUI
- Infrastructure Areas: WUI
- Non-WUI Condition: Not WUI, but present in Idaho County

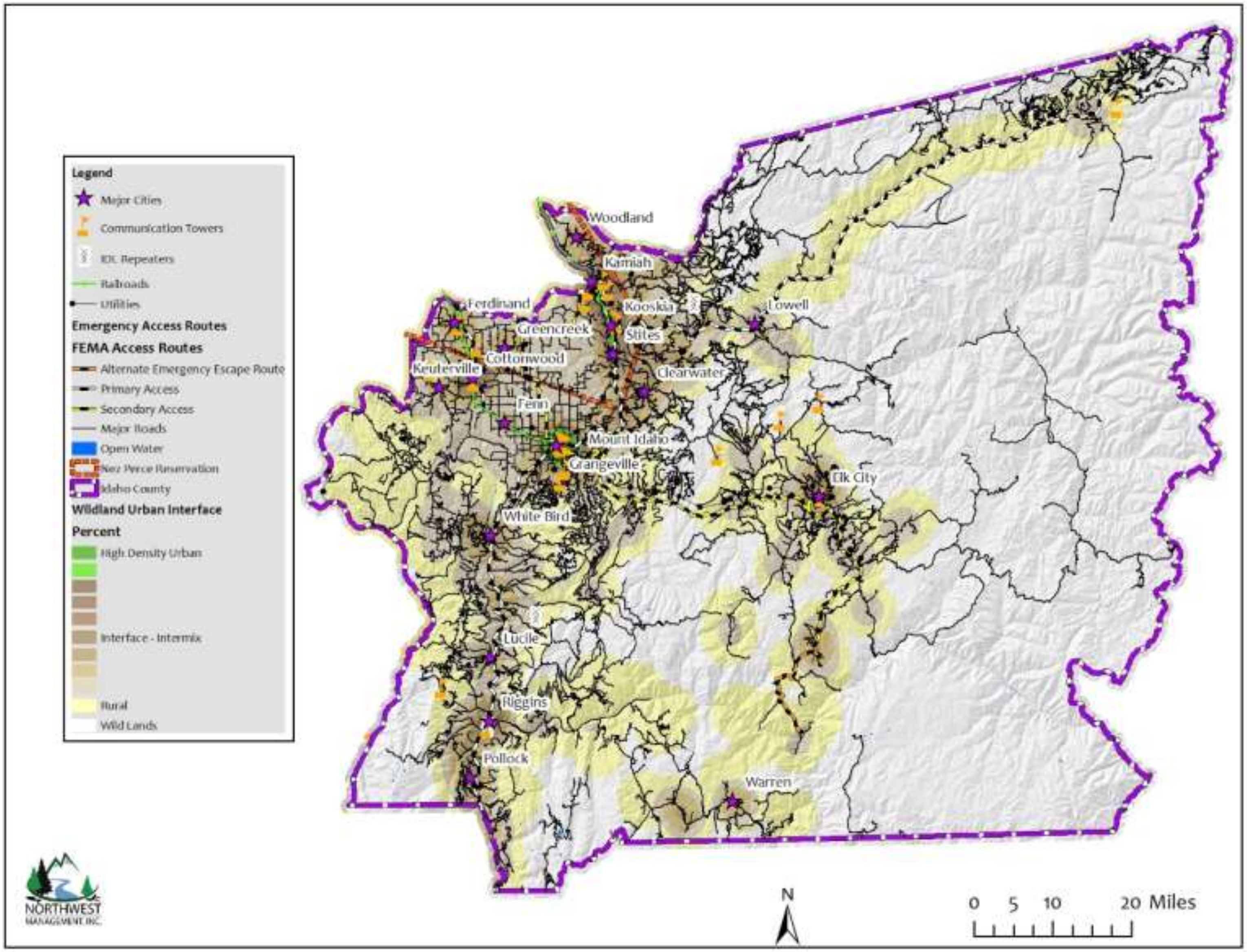
Idaho County's wildland urban interface (WUI) is mostly based on population density. Relative population density across the county was estimated using a GIS based kernel density population model that uses object locations to produce, through statistical analysis, concentric rings or areas of consistent density. To graphically identify relative population density across the county, structure locations are used as an estimate of population density. Aerial photography was used to identify structure locations in 2005. This existing structure layer was updated in 2011 using 2009 NAIP imagery and Idaho County's cadastral data. The resulting output identified the extent and level of population density throughout the county.

By evaluating structure density in this way, WUI areas can be identified on maps by using mathematical formulae and population density indexes. The resulting population density indexes create concentric circles showing high density areas, interface, and intermix condition WUI, as well as rural condition WUI (as defined above). This portion of the analysis allows us to "see" where the highest concentrations of structures are located in reference to relatively high risk landscapes, limiting infrastructure, and other points of concern.

The WUI, as defined here, is unbiased and consistent, allows for edge matching with other counties, and most importantly – it addresses all of the county, not just federally identified communities at risk. It is a planning tool showing where homes and businesses are located and the density of those structures leading to identified WUI categories. It can be determined again in the future, using the same criteria, to show how the WUI has changed in response to increasing population densities. It uses a repeatable and reliable analysis process that is unbiased.

The Healthy Forests Restoration Act makes a clear designation that the location of the WUI is at the determination of the county or reservation when a formal and adopted Community Wildfire Protection Plan is in place. It further states that the federal agencies are obligated to use this WUI designation for all Healthy Forests Restoration Act purposes. The Idaho County Multi-Hazard Mitigation Plan planning committee evaluated a variety of different approaches to determining the WUI for the county and selected this approach and has adopted it for these purposes. In addition to a formal WUI map for use with the federal agencies, it is hoped that it will serve as a planning tool for the county, state and federal agencies, and local fire districts.

Figure 8.3. Wildland Urban Interface in Idaho County, Idaho.



Second-Order Hazard Events

Wildland fires can be caused naturally by lightning or by various technological sources. Wildland fire can also be a secondary effect of another type of hazard. The following chart outlines the interconnection between wildland fire and other types of hazard events.

Table 8.5. Second-Order Hazards Related to Wildland Fire Events.

Related Causal Events	Related Effects
Severe Weather	Structural/Urban Fire
Drought	Civil Unrest
Earthquake	Landslide
Transportation Systems	Transportation Systems
Hazardous Materials	Power Outage
Structural/Urban Fire	

Jurisdictional Risk and Vulnerability Assessments

Idaho County Annex

Wildland Fire Profile

The majority of homes and structures within and surrounding Idaho County communities are along a spectrum from low to moderate to high risk of loss to wildland fire. Individual characteristics of each community and structure dictate the risk factors. The prevalence of tree and shrub fuels pose a moderate to high threat to homes surrounded by these fuels as fire typically spreads quickly through the grasses and burns at relatively high intensities in the brush and forest fuels, especially where declining forest health is a factor. Many homes are at low risk as a result of the management of fuels in the area immediately surrounding the structures and access routes. There are a number of individual homes that have a much higher risk to wildland fire loss largely due to the use of highly ignitable materials in home construction or the lack of defensible space surrounding the home. Home defensibility practices can dramatically increase the probability of home survivability. The amount of fuel modification necessary will depend on the specific attributes of the site. Considering the high spread rates possible in these fuel types, homes need to be protected prior to fire ignitions as there is little time to defend a home in advance of an active fire.

Idaho County is comprised of three ecological sub-regions, the Camas Prairie in the northwestern corner of the County, the arid Snake and Salmon River canyonlands, and the vast forestlands of the Clearwater Mountains.

Agriculture & Rangeland Communities

The communities of Grangeville, Cottonwood, Ferdinand, Fenn, Nezperce, and Craigmont lie in the Camas Prairie vegetative ecosystem known as the “steppe” community. The Steppe Ecosystem is widespread over much of Idaho, eastern Oregon and Washington, and portions of northern Nevada, California and Utah. The central Idaho portion of this ecosystem occurs over a variety of landforms and vegetation types.

Native vegetative communities range from vast expanses of grasslands to old-growth sagebrush communities.

The combination of deep and productive soils make the Camas Prairie well suited to growth of both grassland and forest vegetation. The relatively arid meadow-steppe ecosystem of the Camas Prairie (part of the Palouse prairie bioregion) is dominated by bluebunch wheatgrass, Idaho fescue, and a plethora of wildflowers including Blue Camas for which the prairie was named. Over the course of the past century, most of the native meadow-steppe grasslands have been converted to agriculture fields producing winter wheat, canola, bluegrass, alfalfa, peas, and many other crops.

The steppe is characterized by a persistently warm and arid environment that limits non-cultivated vegetative communities to grass and brush rangelands. Xeric vegetation and hot, dry and windy conditions has resulted in a rich fire history, with relatively frequent fires. The last decade has seen the proliferation of cheatgrass, an exotic grass species that is able to out-compete native bunchgrasses. Cheatgrass responds well to soil disturbance and is found in abundance along roadsides, driveways, new construction areas, and in recently burned areas. Over time, vegetative species composition in unmanaged or non-irrigated land has shifted toward fire prone species, particularly in high use areas where disturbance is common.

Agricultural and irrigation practices surrounding some communities within the Weiser River Valley have created a patchwork of green, lush vegetation and cured rangeland. This patchwork helps to break the continuity of fuels that are available to burn. This pattern is particularly apparent around Council, and Indian Valley. However, dry fuels become continuous above the irrigated zone providing a consistent fuel bed for fire spread. There is little break in the continuity of fuels surrounding the community of Goodrich. The majority of land outside of towns and communities is dominated by xeric vegetation with few breaks in continuity. Under dry and windy conditions, fires in these vegetative types can burn thousands of acres in a single burning period.

Fuels throughout the entire steppe community in Idaho County are quite consistent, dominated by grasslands. Fires in these fuel types tend to spread rapidly, but burn at relatively low intensity. Where grasses become less consistent, wind is needed to push fires through the bunchgrass. Without wind, the fire will drop to the ground and in the absence of fine fuels, fire spread will stop.

Fire behavior and fire regimes have been altered due to the proliferation of cheatgrass. The fine fuel structure and its ability to completely dominate disturbed sites provide a dry, consistent fuel bed for fire. Where this invasive has encroached in grass stands, it now provides a consistent bed of fine fuels that actively carry fire without the influence of wind. Because of these characteristics, cheatgrass will support fire during months of the year and under conditions that native vegetation would not have sustained.

Continued natural and human-caused disturbances will favor cheatgrass; shifting species composition away from native species toward this highly flammable exotic. Consequently, the landscape will become increasingly fire prone over time. Fuels in more populated areas will continue to become increasingly receptive to ignition sources; thus, increasing the frequency of wildland fires.

Forestland Communities

Vegetative structure and composition throughout much of Idaho County is closely related to elevation, aspect, and precipitation. Warm and mesic environments characterize the undulating topography of the Camas Prairie which transitions from the steppe plant communities of the northwest to the forested ecosystems of the south and east. Kueterville, Clearwater, Pinehurst, Harpster, Elk City, Dixie, Warren, and Burgdorf are some of the communities that fall into this type.

At higher elevations and in the mountainous river canyons, moisture becomes less limiting due to a combination of higher precipitation and reduced solar radiation. Vegetative patterns begin to show a shift toward forested communities dominated by ponderosa pine and Douglas-fir at the lower elevations, transitioning to lodgepole pine and subalpine species at the highest elevations. The forested conditions possess a greater quantity of both live and dead and down fuels. Rates of fire spread tend to be lower than those in the grass and shrub lands; however, intensities can escalate dramatically, especially under the influence of slope and wind. These conditions, as well as reduced access and difficult terrain features, can lead to control problems and potentially threaten lives, structures, and other valued resources.

Coniferous woodlands associated with the national forest and wilderness areas cover the majority of the county. The transition zone between forest and meadow-steppe or river breaklands vegetation consists of a complex mosaic dependent on localized topographic and climatic conditions. A ponderosa pine and Douglas-fir habitat type typically forms the lower timberline on hills and low mountains. Mixed Douglas-fir, grand fir, lodgepole pine, and western larch forests dominate at middle elevations, while subalpine fire, lodgepole, and Engelmann spruce occur at higher elevations. Western red cedar and Engelmann spruce commonly grow in moist draws and frost pockets. This type of forest is highly valued for its scenic qualities as well as for its proximity to travel corridors in Adams County. This has led to increased recreational and residential home construction in these areas. The juxtaposition of highly flammable forest types and residential areas will affect the management and response to wildland fires.

Local Event History

Although relatively infrequent, fires in the forest fuel types present throughout much of the County have the potential to result in large, intense fires, resulting in high social and economic costs. This potential was realized in the summer of 2000 when several homes were threatened by wildfire in the Burnt Flats Fire east of the community of White Bird. In 2005, numerous homes near Mount Idaho were threatened by the Blackerby Fire and in 2007 the Poe Cabin destroyed several homes and other structures and threatened many more. These events clearly illustrate the mounting urban-interface issue facing Idaho County. Population growth rates have been greatest in the western portion of the County around Grangeville, Cottonwood, Kamiah, and Riggins with development sprawling along the river corridors and towards bedroom communities such as Mount Idaho, Burgdorf, Keuterville, and White Bird. The growing appreciation for seclusion has led to significant development in many of the lower elevation forests. Frequently, this development is in the dry ponderosa pine – Douglas-fir forest types where grass, needle, and brush surface litter create forest fuel conditions that are at a high propensity for fire occurrence. Human use is strongly correlated with fire frequency, with increasing numbers of fires as use increases. Discarded cigarettes, tire fires, and hot catalytic converters increase the potential for fire starts along roadways. Careless and unsupervised use of fireworks also contributes to unwanted and unexpected wildland fires. Further contributing to ignition sources are the debris burners and "sport burners" who use fire to rid ditches of weeds and other burnable materials. The increased potential for fire starts and the fire prone landscapes in which homes have been constructed greatly increases the potential for fires in interface areas.

Fire departments within Idaho County have reported a general increase in the number of fires within the County. Although there have been only a few homes lost to wildland fires in the recent past, the potential is growing. Fire departments feel as though pure luck has been on the side of many homeowners, as more and more fires seem to be controlled at the doorstep of residents' homes. It is quite probable that homes will eventually be lost to wildland fire. However, there are a number of actions that can be taken now that can decrease the probability that these events will occur.

Detailed records of wildfire ignitions and extents from the US Forest Service (USFS) and Bureau of Land Management (BLM) have been analyzed. In interpreting these data, it is important to keep in mind that the information represents only the lands protected by the agency specified and may not include all fires in areas covered only by local fire departments or other agencies.

The US Forest Service, BLM, and IDL database of wildfire ignitions used in this analysis includes ignition and extent data from 1980 through 2013. During this period, the agencies recorded an average of 67 wildfire ignitions per year resulting in an average total burn area of nearly 33,355 acres per year. According to this dataset, the vast majority of fires occurring in Idaho County are natural-caused and result in the majority of acres burned.

The highest number of ignitions was witnessed in 2006 with 338 separate ignitions. However, the greatest number of acres burned in a single year occurred in 2007 when nearly 490,232 acres were scorched.

When analyzed by decade from 1980-2013, this shows that the total number of ignitions has not changed significantly (~35 ignitions per decade); however, there are fluctuations in the total number of acres burned each decade from 35,509 acres burned in the 1980s to 24,513 in the 1990s and 43,474 acres burned in the 2000s. This could be attributed to changing climate conditions or invasion of exotic plant species. Nevertheless, it should be noted that the Forest Service data prior to 1986 is likely underreported.

Table 8.6. Summary of Federal and State databases 1980-2013.

General Cause	Number of Ignitions	Percent of Total Ignitions	Acres Burned	Percent of Total Acres
Human-Caused	317	13.5%	70,832	6%
Natural Ignition	1,981	84.5%	1,057,633	93%
Unknown Ignitions	46	2%	5,615	<1%
Total	**2,344**	**100%**	**1,134,080**	**100%**

The data reviewed above provides a general picture regarding the level of wildland-urban interface fire risk within Idaho County. There are several reasons why the fire risk may be even higher than suggested above, especially in developing wildland-urban interface areas.

1) Large fires may occur infrequently, but statistically they will occur. One large fire could significantly change the statistics. In other words, 30 years of historical data may be too short to capture large, infrequent wildland fire events.

2) The level of fire hazard depends profoundly on weather patterns. A several year drought period would substantially increase the probability of large wildland fires in Adams County. For smaller vegetation areas, with grass, brush and small trees, a much shorter drought period of a few months or less would substantially increase the fire hazard.

3) The level of fire hazard in wildland-urban interface areas is likely significantly higher than for wildland areas as a whole due to the greater risk to life and property. The probability of fires starting in interface areas is much higher than in wildland areas because of the higher population density and increased activities. Many fires in the wildland urban interface are not recorded in agency datasets because the local fire department responded and successfully suppressed the ignition without mutual aid assistance from the federal agencies.

4) The ignition totals would likely increase significantly if we were to add the local Fire Protection District data to the wildfire summary. Not all districts maintain records of wildfires that they respond to annually. However, it is assumed that although the number of ignitions would increase the number of acres burned would not.

Wildfire Ignition Profile

Detailed records of wildfire ignitions and extents from the Idaho Department of Lands (IDL), US Forest Service (USFS), and Bureau of Land Management (BLM) have been analyzed. In interpreting these data, it is important to keep in mind that the information represents only the lands protected by the agency specified and may not include all fires in areas covered only by local fire departments or other agencies.

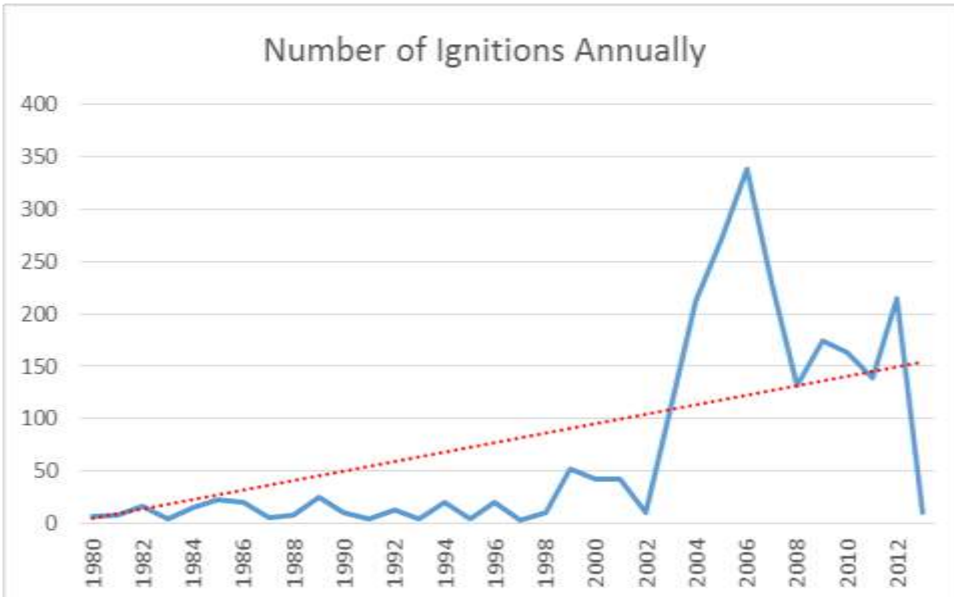
The Federal fire point data for all agencies (1980-2014) database of wildfire ignitions used in this analysis includes ignition and extent data within their jurisdictions. During this period, the agencies recorded an average of 67 wildfire ignition per year resulting in an average total burn area of 33,355 acres per year. According to this dataset, the vast majority of fires occurring in Idaho County are natural caused; however, human caused/unknown caused fires do occur.

Table 8.7. Summary of Cause from State and Federal databases 1980-2014.

General Cause	Number of Ignitions	Percent of Total Ignitions	Acres Burned	Percent of Total Acres
Human-Caused	317	13%	74,837	6%
Natural Ignition	1,981	83%	1,073,409	93%
Unknown	46	2%	5,615	<1%
Total	**2,376**	**98%**	**1,153,862**	**100%**

Based on the agencies' combined datasets specific to Idaho County, there is an upward trend in both the number of ignitions and acres burned per year since 1980. The upward trends could be attributed to a higher amount of people moving to more rural areas of Idaho County. Another contributing factor could be the spread of invasive species. It should be noted that a majority of the wildland fires occurring in Idaho County are not reported at the State or Federal level, therefore a separate analysis of fire history at the Fire District level is warranted.

Figure 8.4. Summary of Idaho County State and Federal Ignitions



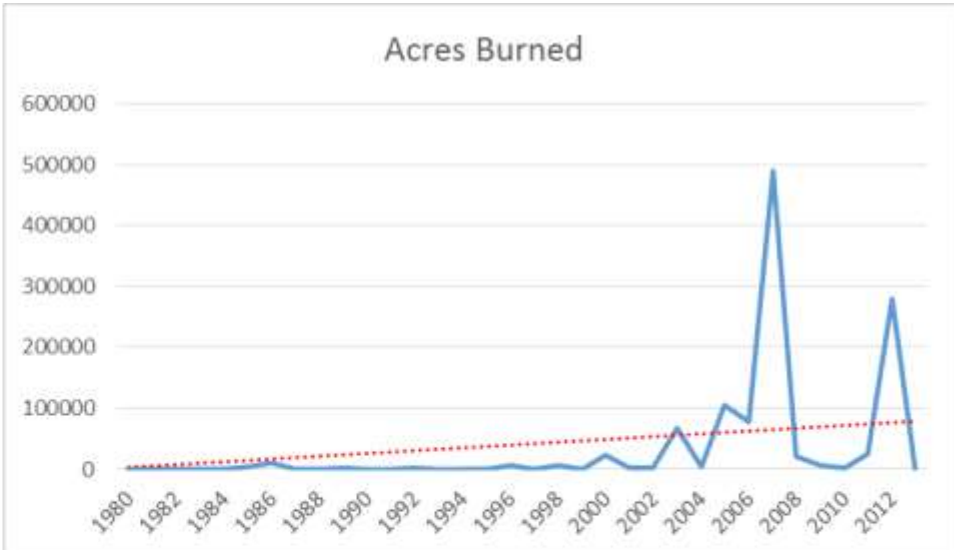
The data reviewed above provides a general picture regarding the level of wildland-urban interface fire risk within Idaho County. There are several reasons why the fire risk may be even higher than suggested above, especially in developing wildland-urban interface areas.

1) Large fires may occur infrequently, but statistically they will occur. One large fire could significantly change the statistics. In other words, 40 years of historical data may be too short to capture large, infrequent wildland fire events.

2) The level of fire hazard depends profoundly on weather patterns. A several year drought period would substantially increase the probability of large wildland fires in Idaho County. For smaller vegetation areas, with grass, brush and small trees, a much shorter drought period of a few months or less would substantially increase the fire hazard.

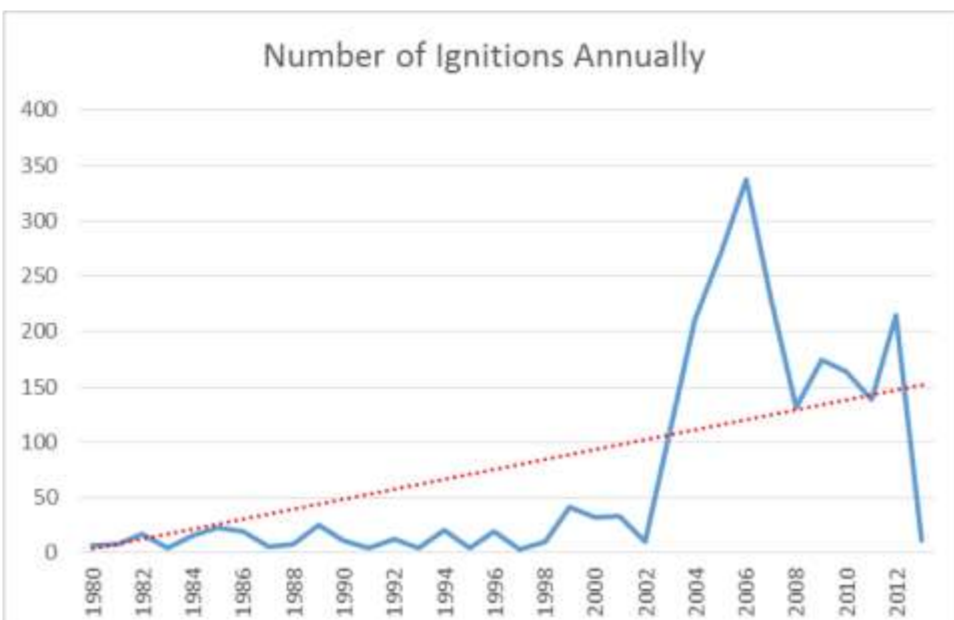
3) The level of fire hazard in wildland-urban interface areas is likely significantly higher than for wildland areas as a whole due to the greater risk to life and property. The probability of fires starting in interface areas is much higher than in wildland areas because of the higher population density and increased activities. Many fires in the wildland urban interface are not recorded in agency datasets because the local fire department responded and successfully suppressed the ignition without mutual aid assistance from the state or federal agencies.

Figure 8.4. Summary of Idaho County State and Federal Acres Burned.



The fire suppression agencies in Idaho County respond to numerous wildland fires each year, but few of those fires grow to a significant size. According to national statistics, only 2% of all wildland fires escape initial attack. However, that 2% accounts for the majority of fire suppression expenditures and threatens lives, properties, and natural resources. These large fires are characterized by a size and complexity that require special management organizations drawing suppression resources from across the nation. These fires create unique challenges to local communities by their quick development and the scale of their footprint.

Figure 8.5. Summary of State and Federal Annual Ignitions 1980-2013



Probability of Future Occurrence

Fire was once an integral function within the majority of ecosystems in Idaho. The seasonal cycling of fire across the landscape was as regular as the July, August and September lightning storms plying across the Camas Prairie and in the canyons of southwestern Idaho County. Depending on the plant community composition, structural configuration, and buildup of plant biomass, fire resulted from ignitions with varying intensities and extent across the landscape. Shorter return intervals between fire events often resulted in less dramatic changes in plant composition.[78] The fires burned from 1 to 47 years apart, with most at 5- to 20-year intervals.[79] With infrequent return intervals, plant communities tended to burn more severely and be replaced by vegetation different in composition, structure, and age.[80] Native plant communities in this region developed under the influence of fire, and adaptations to fire are evident at the species, community, and ecosystem levels. Fire history data (from fire scars and charcoal deposits) suggest fire has played an important role in shaping the vegetation throughout Idaho County.

Ideally, historical fire data would be used to estimate the annual probability for fires in Idaho County. However, current data are not adequate to make credible calculations because the data for local, state, and federal responsibility areas are not reported by the same criteria. Nevertheless, the data reviewed above provide a general picture of the level of wildland-urban interface fire risk for Idaho County overall. Based on the historical information available, Idaho County has a very high probability of wildland fires occurring on an annual basis. Based on the historical data provided by the U.S. Forest Service and BLM, a fire over 25,000 acres should be expected every three to five years.

Ignition potential is also high throughout the County. Recreational areas, major roadways, debris burning, and agricultural equipment are typically the most likely human ignition sources. Lightning is also a significant source of wildfires in Idaho County.

Impacts of Wildland Fire Events

Wildland fires, big and small, are dangerous to both Idaho County residents and emergency response personnel. Wildland fire suppression activities have a very high frequency of injuries, such as heat exhaustion and smoke inhalation, and have caused numerous deaths nationwide. Fire events in Idaho County typically result in a multi-department and agency response effort; thus, coordinating activities and ensuring everyone's safety is paramount.

---

[78] Johnson, C.G. 1998. Vegetation Response after Wildfires in National Forests of Northeastern Oregon. 128 pp.

[79] Barrett, J.W. 1979. Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge. USDA Forest Service, General Technical Report PNW-97. Pacific Northwest Forest and Range Experiment Station, Portland, OR. 106 p.

[80] Johnson, C.G.; Clausnitzer, R.R.; Mehringer, P.J.; Oliver, C.D. 1994. Biotic and Abiotic Processes of Eastside Ecosytems: the Effects of Management on Plant and Community Ecology, and on Stand and Landscape Vegetation Dynamics. Gen. Tech. Report PNW-GTR-322. USDA-Forest Service. PNW Research Station. Portland, Oregon. 722pp.

Local residents with property in the path of wildland fire will likely suffer the greatest impacts through loss of structures and/or the value of any timber or agricultural crops on their land. Many fires require an evacuation of nearby residences in order to ensure the safety of citizens. Evacuation procedures require the coordination of law enforcement and fire service organizations and may involve temporary sheltering in extreme cases.

Idaho County, like most areas, has sensitive populations, such as elderly residents and children, who may be affected by air quality during a wildland fire. Smoke and particulates can severely degrade air quality, triggering health problems. In areas heavily impacted by smoke, people with breathing problems might need additional services from doctors or emergency rooms.

Commerce in Idaho County and the rest of the region may also be interrupted by wildland fires. Transportation corridors will likely be temporarily closed or slowed due to a fire burning in the area. Heavy smoke from a wildfire several miles away could be dense enough to make travel unsafe on roadways.

The environmental impacts from a fire are dependent on the vegetation present and the intensity of the fire. Most of the rangeland and forest ecosystems present in Idaho County are adapted to periodic fire events and benefit from occasional, low intensity burns. On the other hand, overcrowded forest conditions or over mature stands of sage brush will likely burn much more intensely than occurred historically. These types of fires tend to result in a high rate of mortality in the vegetation and often adversely impact soil conditions. High intensity fires are also much more dangerous and difficult to suppress.

Idaho County is actively pursuing funds to help with wildland fire mitigation projects and public education programs. While mitigation efforts will significantly improve the probability of a structure's survivability, no amount of mitigation will guarantee survival.

Value of Resources at Risk

It is difficult to estimate potential losses in Idaho County due to wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. However, one can draw conclusions from the average costs to suppress a wildland fire. Using information from the National Interagency Fire Center's website[81], there were 63,212 wildland fires that federal agencies responded to in 2014. The cost to suppress these fires totaled $1,522,149,000 which averages out to approximately $24,080 per ignition. Large wildland fires can cost hundreds of thousands and even millions of dollars to suppress.

Typically, structures located in forested areas without an adequate defensible space or fire resistant landscaping have the highest risk of loss. Nevertheless, homes and other structures and infrastructure located in the grasslands or agricultural regions are not without wildfire risk. Grass fires are often the

[81] National Interagency Fire Center website. Federal Firefighting Costs (Suppression Only). https://www.nifc.gov/fireInfo/fireInfo_documents/SuppCosts.pdf. Accessed July, 2015.

most dangerous due to high rates of spread. Fires in this fuel type are considered somewhat easier to suppress given the appropriate resources, but they can also be the most destructive

Individual Community Assessments

City of Grangeville

Wildland Fire Profile

The community of Grangeville is located on the Camas Prairie at approximately 3,300 feet elevation. The surrounding area is primarily farmland to the north, east, and west, with relatively flat terrain to rolling hills. Vegetation is predominantly agricultural in nature interspersed with uncultivated grasslands and isolated open ponderosa pine stands. To the south, terrain slopes upward to just over 6,000 feet within five miles of town. Vegetation quickly changes from the open grasslands of the Camas Prairie to dry-site Ponderosa Pine and Douglas-fir stands to denser stands of mixed conifer on the north-facing slopes. Drainages are predominantly moister site spruce/fir stands.

The Crimson Ridge Subdivision and Bear Den RV Park are new developments being constructed along U.S. Highway 95 and Fish Hatchery Road west of town. At completion, Crimson Ridge will encompass 80 new home sites. Additional home sites are also being developed south of Bear Den RV Park along Fish Hatchery Road. Other subdivisions include Meadow Grass Acres, The Vineyards, and Golden Hills.

Fuels Assessment

There is very little native vegetation remaining near this prairie ecosystem community. The native Camas Prairie plant community has been almost exclusively replaced by agriculture and pasture lands. A few patches of native species, such as big bluestem, blue camas, shooting star, and lupines, can be found sporadically along fence lines or in non-tillable corners. The remnant prairie grasslands historically burned at relatively frequent intervals, but generally were lower intensity fires. The agricultural fields currently dominating the landscape become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or high winds. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. However, modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Infrastructure

Residents of Grangeville depend on the Three Mile Creek Watershed for most of the water resources; however, homeowners outside of the city limits typically have drilled personal wells. Most farmers in this area do not irrigate so supplementary wells for agricultural purposes are not usually necessary; however, several ranchers use surface runoff or small springs to provide water for livestock. Ground water resources would not likely be seriously affected by wildland fire.

The Three Mile Creek Watershed, located three miles directly south of Grangeville, consists of ponderosa pine and Douglas-fir stands. Much of this drainage has been logged over the years with little subsequent management. There are several acres of dense pine and fir regeneration stands intermixed with multilayered stands of Douglas-fir, pine, and western larch. These slopes are of moderate to high concern for potential crown fire spread leading up to the High Camp Loop Road, where communications facilities are at risk as well as to private homes on either side of this drainage. Potential impacts of a large stand-replacing fire in this area could negatively affect the community of Grangeville via potential flooding, erosion, and degradation of water quality.

Escape

Highway 95 travels north and south through Grangeville. Highway 13 travels east then north along the South Fork of the Clearwater River towards Kooskia. Highway 95 to the north is surrounded by agriculture and pasture that should remain safe for travel in the event of a wildfire. Highway 95 to the south and Highway 13 to the east both travel through moderate terrain surrounded by forests. These access routes have significant risk of being cut-off by wildfire.

Community Assessment

Residents of the Grangeville area have low to moderate risk of experiencing a wildland fire due to the extensive agricultural development. Nevertheless, in the event of wildfire, the light fuels would likely support a very fast-moving rangeland fire. Therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to such an event.

The Crimson Ridge Subdivision and Bear Den RV Park are new developments in Grangeville that are located between the city center and the Grangeville Country Club along Highway 95. This area is at low risk of wildfire due to the surrounding prairie vegetation and pasture ground. Meadow Grass Acres north of Grangeville and The Vineyards are also at low risk of wildfire. As more development occurs in this area, the fire risk will likely be reduced further. Nevertheless, fire ignitions are highly correlated with population density; more people typically means more human caused fire starts. There is currently a gap in fire coverage between the Harpster Fire District and the Grangeville Rural Fire District. This results in the Golden Hills Subdivision area being without structural protection.

As the community grows, more and more homes are also being built in the wildland urban interface, particularly south and southwest of town. Many of these new homes abut forest-type fuels and are accessed by one-way in and one-way out driveways, which dramatically increases the likelihood of loss of life or property in the event of a wildland fire. These homes and other buildings are at much higher risk of experiencing a fire.

The primary fire risk is associated with the abundance of human activity and the use of machinery near dry, flashy fuels. The receptive nature of these fuels increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds.

Potential Mitigation Activities

Vegetation in this area should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

- Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.
- Prune trees to a minimum of 12 feet of all branches.
- Prune 1/3 of the live crown of smaller trees.
- Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.
- Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

The Three Mile Creek Watershed should be a high priority for fire mitigation treatments due to the dependence of the community on the water resources produced by this facility.

Access roads in these areas require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. The majority of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some of the housing developments in this area have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. The vast majority of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. High visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

Fire Protection

The Grangeville Rural Fire District is responsible for structural fire protection in this area, while the USDA Forest Service, the Idaho Department of Lands, and the USDI Bureau of Land Management provide wildland fire protection.

Probability of Future Occurrence

The probability of a wildland fire threatening Grangeville on an annual basis is moderate. Homes and other structures located in the forestlands or agricultural fields within or surrounding the community have a high wildfire risk. Rangeland or grass fires are often the most dangerous due to high rates of spread. Fires in this fuel type are considered somewhat easier to suppress given the appropriate resources, but they can also be the most destructive. Homes along the perimeter of the community would have the highest risk due to their adjacency to flashy fuels. The agriculture areas surrounding Ferdinand have historically had a fire frequency of less than 35 years with low to mixed severity. The current vegetation condition class surrounding Ferdinand suggests that there has been a high alteration of the vegetation in this area. This is likely attributed to prairie being converted for agricultural uses.

Impacts of Wildland Fire Events

The potential impacts from a wildfire in Grangeville are similar to the impacts described for Idaho County as a whole. All fires pose a significant safety risk to residents and emergency service personnel. Individual structures, property, and livelihoods could be severely damaged or lost as a result of a fire; however, the community is not likely to suffer severe or long-term economic losses.

A fire in the grasslands surrounding the community may benefit the ecological environment as nutrients are recycled into the soil. Generally, grass and forbs are rejuvenated by a low intensity fire and grow back quickly; however, heavy rains immediately after a fire could cause erosion.

Smoke from a nearby wildland fire may impact sensitive populations within the community due to degraded air quality conditions. Smoke and/or flames will also impact transportation corridors connecting Grangeville to other communities; thus, travel and commerce may be interrupted.

Value of Resources at Risk

It is difficult to estimate potential losses in Grangeville from wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is unlikely that more than a few structures or other properties within the city limits of Grangeville would be lost or damaged by a wildland fire; however, residents in the immediate vicinity may be directly impacted. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. Thus, no value estimates were made for this hazard.

City of Ferdinand

Wildland Fire Profile

The city of Ferdinand is located on the Camas Prairie in the northwestern portion of Idaho County. Farming and ranching drives the economy in this small city. Agricultural fields surround the city center and extend for several miles in all directions. This area is almost entirely privately owned and there are very few trees and little native prairie grasslands dotting the relatively even landscape. U.S. Highway 95 passes directly through Ferdinand and is the main method of transporting the grains, canola, peas, and other crops that are grown in the area. Ferdinand is encompassed by the Nez Perce Indian Reservation.

Fuels Assessment

There is very little native vegetation remaining near this prairie ecosystem community. The native Camas Prairie plant community has been almost exclusively replaced by agriculture and pasture lands. A few patches of native species, such as big bluestem, blue camas, shooting star, and lupines, can be found sporadically along fence lines or in non-tillable corners. The remnant prairie grasslands historically burned at relatively frequent intervals, but generally were lower intensity fires. The agricultural fields currently dominating the landscape become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or high winds. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires.

However, modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Infrastructure

Residents of Ferdinand either are connected to a municipal well or have drilled personal wells. Most farmers in this area do not irrigate so supplementary wells for agricultural purposes are not usually necessary; however, several ranchers use surface runoff or small springs to provide water for livestock. These water resources would not likely be seriously affected by a rangeland fire.

The Grangeville Line of the Camas Prairie Railroad traveling from Spalding through Ferdinand and Fenn to Grangeville was abandoned several years ago. This line historically transported grain, lumber, fertilizer, and other products to and from Camas Prairie markets.

Escape

Highway 95 travels north and south through Ferdinand. The highway is surrounded by agriculture and pasture, in all directions, that should remain safe for travel in the event of a wildfire.

Community Assessment

Residents in the Ferdinand area have low risk of experiencing a wildland fire due to the extensive agricultural development. Nevertheless, in the event of wildfire, the light fuels would likely support a very fast-moving rangeland fire. Therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to such an event.

The primary fire risk is associated with the abundance of human activity and the use of machinery near dry, flashy fuels. The receptive nature of these fuels increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds.

Potential Mitigation Activities

Vegetation in this area should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

- Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.
- Prune trees to a minimum of 12 feet of all branches.
- Prune 1/3 of the live crown of smaller trees.
- Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.
- Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

Access roads in these areas require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. The majority of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some of the housing developments in this area have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. The vast majority of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. High visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

Fire Protection

The Ferdinand Volunteer Fire Department is responsible for structural protection around the community of Ferdinand. Due to the many rural farms and ranches, many of the districts/departments typically have mutual aid agreements in order to provide the best service possible and to provide back up for each other.

Probability of Future Occurrence

The probability of a wildland fire threatening Ferdinand on an annual basis is low. Homes and other structures located adjacent to agricultural fields within or surrounding the community have a higher wildfire risk. Rangeland or grass fires are often the most dangerous due to high rates of spread. Fires in this fuel type are considered somewhat easier to suppress given the appropriate resources, but they can also be the most destructive. Homes along the perimeter of the community would have the highest risk due to their adjacency to flashy fuels. The agriculture areas surrounding Ferdinand have historically had a fire frequency of less than 35 years with low to mixed severity. The current vegetation condition class surrounding Ferdinand suggests that there has been a high alteration of the vegetation in this area. This is likely attributed to prairie being converted for agricultural uses.

Impacts of Wildland Fire Events

The potential impacts from a wildfire in Ferdinand are similar to the impacts described for Idaho County as a whole. All fires pose a significant safety risk to residents and emergency service personnel. Individual structures, property, and livelihoods could be severely damaged or lost as a result of a fire; however, the community is not likely to suffer severe or long-term economic losses.

A fire in the grasslands surrounding the community may benefit the ecological environment as nutrients are recycled into the soil. Generally, grass and forbs are rejuvenated by a low intensity fire and grow back quickly; however, heavy rains immediately after a fire could cause erosion.

Smoke from a nearby wildland fire may impact sensitive populations within the community due to degraded air quality conditions. Smoke and/or flames will also impact transportation corridors connecting Ferdinand to other communities; thus, travel and commerce may be interrupted.

Value of Resources at Risk

It is difficult to estimate potential losses in Ferdinand from wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is unlikely that more than a few structures or other properties within the city limits of Ferdinand would be lost or damaged by a wildland fire; however, residents in the immediate vicinity may be directly impacted. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. Thus, no value estimates were made for this hazard.

City of Cottonwood

Wildland Fire Profile

The city of Cottonwood is located on the Camas Prairie upland along U.S. Highway 95 between Fenn and Ferdinand. The city is surrounded by cultivated agriculture and hay ground. Cottonwood Butte is a 5,730 foot knob rising just north of Keuterville and west of Cottonwood. The Butte creates a rain shadow resulting in drier conditions on the east slope.

Fuels Assessment

There is very little native vegetation remaining near this prairie ecosystem community. The native Camas Prairie plant community has been almost exclusively replaced by agriculture and pasture lands. A few patches of native species, such as big bluestem, blue camas, shooting star, and lupines, can be found sporadically along fence lines or in non-tillable corners. The remnant prairie grasslands historically burned at relatively frequent intervals, but generally were lower intensity fires. The agricultural fields currently dominating the landscape become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or high winds. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. However, modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Infrastructure

Residents of Cottonwood either are connected to a municipal well or have drilled personal wells. Most farmers in this area do not irrigate so supplementary wells for agricultural purposes are not usually necessary; however, several ranchers use surface runoff or small springs to provide water for livestock. These water resources would not likely be seriously affected by a rangeland fire.

The Grangeville Line of the Camas Prairie Railroad traveling from Spalding through Cottonwood and Fenn to Grangeville was abandoned several years ago. This line historically transported grain, lumber, fertilizer, and other products to and from Camas Prairie markets.

Escape

Highway 95 travels north and south adjacent to Cottonwood. The highway is surrounded by agriculture and pasture, in all directions, that should remain safe for travel in the event of a wildfire.

Community Assessment

Residents in the Cottonwood area have low risk of experiencing a wildland fire due to the extensive agricultural development. Nevertheless, in the event of wildfire, the light fuels would likely support a very fast-moving rangeland fire. Therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to such an event.

The primary fire risk is associated with the abundance of human activity and the use of machinery near dry, flashy fuels. The receptive nature of these fuels increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds.

Potential Mitigation Activities

Vegetation in this area should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

- Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.
- Prune trees to a minimum of 12 feet of all branches.
- Prune 1/3 of the live crown of smaller trees.
- Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.
- Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

Access roads in these areas require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. The majority of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some of the housing developments in this area have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. The vast majority of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. High visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

Fire Protection

The Cottonwood Volunteer Fire Department is responsible for structural protection around the community of Cottonwood. Due to the many rural farms and ranches, many of the districts/departments typically have mutual aid agreements in order to provide the best service possible and to provide back up for each other.

Probability of Future Occurrence

The probability of a wildland fire threatening Cottonwood on an annual basis is low. Homes and other structures located adjacent to agricultural fields within or surrounding the community have a higher wildfire risk. Rangeland or grass fires are often the most dangerous due to high rates of spread. Fires in this fuel type are considered somewhat easier to suppress given the appropriate resources, but they can also be the most destructive. Homes along the perimeter of the community would have the highest risk due to their adjacency to flashy fuels. The agriculture areas surrounding Cottonwood have historically had a fire frequency of less than 35 years with low to mixed severity. The current vegetation condition class surrounding Cottonwood suggests that there has been a high alteration of the vegetation in this area. This is likely attributed to prairie being converted for agricultural uses.

Impacts of Wildland Fire Events

The potential impacts from a wildfire in Cottonwood are similar to the impacts described for Idaho County as a whole. All fires pose a significant safety risk to residents and emergency service personnel. Individual structures, property, and livelihoods could be severely damaged or lost as a result of a fire; however, the community is not likely to suffer severe or long-term economic losses.

A fire in the grasslands surrounding the community may benefit the ecological environment as nutrients are recycled into the soil. Generally, grass and forbs are rejuvenated by a low intensity fire and grow back quickly; however, heavy rains immediately after a fire could cause erosion.

Smoke from a nearby wildland fire may impact sensitive populations within the community due to degraded air quality conditions. Smoke and/or flames will also impact transportation corridors connecting Cottonwood to other communities; thus, travel and commerce may be interrupted.

Value of Resources at Risk

It is difficult to estimate potential losses in Cottonwood from wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is unlikely that more than a few structures or other properties within the city limits of Cottonwood would be lost or damaged by a wildland fire; however, residents in the immediate vicinity may be directly impacted. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. Thus, no value estimates were made for this hazard.

City of Riggins

Wildland Fire Profile

The community of Riggins is located at the intersection of the Main Salmon and the Little Salmon Rivers. Drainages coming off the western slope of the Salmon River canyon have become rural residential areas. There are several homes and small ranches leading up to the Nez Perce National Forest boundary on the Race Creek Road, Bean Creek Road, Kessler Creek Road, and the Seven Devils Road (Squaw Creek and Papoose Creek).

The economy of this small roadside community is almost completely dependent on the flow of tourist dollars. As the "Whitewater Capital of the World", Riggins is a bustling metropolis throughout the rafting and kayaking seasons. This area is also popular for its fishing and camping opportunities.

Fuels Assessment

The rangeland vegetation dominating the city site is typically of the Salmon River canyon consisting of cured grasses and patches of sage brush. Scattered ponderosa pine grows in many of the shallow draws where the soil moisture is slightly higher, particularly on the east side of the river. Several hardwood species can also be found along the narrow banks of the Little Salmon. The slopes rising from the city center are actively grazed by livestock and wildlife, which helps to reduce the fine fuel loads. Fires in rangeland fuels typically burn at low intensities, but spread very rapidly, especially under the influence of up canyon winds.

Along the upper breaks on the west side of the river, land is dominated by forest cover intermixed with rangelands. These habitat types will experience ground fires under normal fire conditions, but have the potential to spread to crowns when fuel moisture is low and winds are high. Ladder fuels are present in the interface between the range lands and the forest lands, which increases the likelihood of a torching and crowning wildfire. The dry nature of the vegetation combined with steep canyon slopes makes this area very susceptible to rapidly spreading rangeland fires.

Infrastructure

Residents of Riggins depend on a community well system and personal wells. These water resources would not likely be severely affected by a wildland fire; however, the electrical power that operates the pumps on the wells could potentially be interrupted or damaged leaving all or a portion of the community without water.

Escape

U.S. Highway 95 is the main access into Riggins. This two-lane highway provides rapid egress both to the north and south. Although it dead ends several miles up the Main Salmon River, the Salmon River Road is heavily used during the summer months. Boaters, anglers, rafters, and residents use this narrow corridor excessively. The gravel/paved, single-lane roadway follows the river's contours eastward crossing several light duty bridges along the way. There are only a few turnouts, no guard rails, and bridges are inadequately signed. This road has recently undergone a major renovation project, which greatly improves safety along this roadway. Heavy traffic and recreational use make this passageway extremely prone to a fire ignition. Furthermore, emergency evacuation of this corridor would be difficult and unsafe. The only alternate escape route from Riggins is the Bean Creek Road, a Forest Road traveling north along the ridge on the west side of the river all the way back to White Bird. In order to function as a safe escape route, this road would need clearing of hazardous vegetation, regular maintenance, and emergency route signage.

Community Assessment

Residents of the Riggins area have moderate to high risk of experiencing a wildland fire due to the intense recreational activities, dry, flashy fuels, regular stiff up canyon winds, and steep slopes rising from the river canyon. Therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to such an event.

Many homes in this area are accessed by one-way in and one-way out driveways. It is difficult for emergency response personnel to protect these homes safely; therefore, it is more likely that homes with this characteristic will experience loss of life or property in the event of a wildland fire. Many of the homes in the creek drainages on the west side of the Salmon River are accessed by only a single roadway. In most cases, these roads dead end near the top of the ridge within the National Forest. Homes in the Race Creek, Squaw Creek, Bean Creek, and Kessler Creek drainage are at a higher fire risk due to the flashy fuels and limited ingress and egress. This situation is further exacerbated by their location in a draw, which may funnel hot gases and fumes. Fires in this type of topography are generally difficult and dangerous for firefighters to suppress.

Homes located on mid or upper slopes are in danger of becoming threatened by rangeland fire spreading rapidly up slope. These homes generally have poor access and would be difficult to protect in a wildfire situation. The receptive nature of the fuels in the area increases the likelihood of a fire start. Residences exhibiting these traits have an increased fire risk. However, most homeowners maintain a defensible space around structures by watering their yards and mowing grass and weeds.

Potential Mitigation Activities

Vegetation in this area should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

- Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.
- Prune trees to a minimum of 12 feet of all branches.
- Prune 1/3 of the live crown of smaller trees.
- Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.
- Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

Development of evacuation plans for the residents located in the small creek drainages west of Riggins is necessary to assure orderly evacuations in the event of a threatening wildland fire. Designation and posting of escape routes would reduce chaos and escape times for fleeing residents. Most residents would benefit from the construction of additional escape routes to Highway 95. Community safety zones should also be established in the event of a compromised evacuation. Efforts should be made to educate homeowners through existing homeowners associations or creation of such organizations to act as conduits for this information.

Grazing generally works positively towards reducing the fine fuels in the vegetation types surrounding Riggins, particularly in rangeland areas and open forest stands with grass and brush in the understory. Many landowners already graze livestock in areas that would otherwise be more susceptible to carrying a wildland fire. Grazing is a relatively inexpensive fire mitigation tool that typically works very well with little negative impact on the land.

Access roads in these areas require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. The majority of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some of the housing developments in this area have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. The vast majority of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. High visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

Fire Protection

The Riggins City Volunteer Emergency Services has equipment and a station in Riggins, which provides for city fire protection and the protection of homes within the ten-mile mutual aid area with Salmon River Rural Fire Department. This station also houses two ambulances. The Nez Perce National Forest is responsible for wildland fire control west and north of the Salmon River, while the Payette National Forest is responsible for wildland fire control east and south of the river.

Probability of Future Occurrence

The probability of a wildland fire threatening Riggins on an annual basis is moderate to high. Homes and other structures located adjacent to rangelands within or surrounding the community have a high wildfire risk. Rangeland or grass fires are often the most dangerous due to high rates of spread. Fires in this fuel type are considered somewhat easier to suppress given the appropriate resources, but they can also be the most destructive. Homes along the perimeter of the community would have the highest risk due to their adjacency to flashy fuels. The rangeland areas surrounding Riggins have historically had a fire frequency of less than 35 years with low to mixed severity. The current vegetation condition class surrounding Riggins suggests that there has been a moderate to high alteration of the vegetation in this area. This is likely attributed to grazing practices and the associated effects, such as, invasive plant outbreaks.

Impacts of Wildland Fire Events

The potential impacts from a wildfire in Riggins are similar to the impacts described for Idaho County as a whole. All fires pose a significant safety risk to residents and emergency service personnel. Individual structures, property, and livelihoods could be severely damaged or lost as a result of a fire; however, the community is not likely to suffer severe or long-term economic losses.

A fire in the rangelands surrounding the community may benefit the ecological environment as nutrients are recycled into the soil. Generally, grass and forbs are rejuvenated by a low intensity fire and grow back quickly; however, heavy rains immediately after a fire could cause erosion.

Smoke from a nearby wildland fire may impact sensitive populations within the community due to degraded air quality conditions. Smoke and/or flames will also impact transportation corridors connecting Riggins to other communities; thus, travel and commerce may be interrupted.

Value of Resources at Risk

It is difficult to estimate potential losses in Riggins from wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is unlikely that more than a few structures or other properties within the city limits of Riggins would be lost or damaged by a wildland fire; however, residents in the immediate vicinity may be directly impacted. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. Thus, no value estimates were made for this hazard.

Cities of Kooskia and Stites

Wildland Fire Profile

The cities of Kooskia and Stites are located three miles from each other on State Highway 13. Kooskia is located at the confluence of the Middle Fork and the South Fork of the Clearwater River. Stites is located three miles upstream on the South Fork. The elevation in Kooskia is 1,260 feet, and Stites is approximately 60 feet higher. Both communities are located in the valley bottom immediately adjacent to the South Fork of the Clearwater River. Kooskia has a population in town of 675 that triples outside the city limit. Stites has a population of 226 that increases only slightly outside the city limit.

Fuels Assessment

Much of the landscape immediately surrounding Kooskia and Stites is dominated by grasses and shrubs with a few open stands of ponderosa pine and Douglas-fir randomly interspersed. Heavier timber conditions can be found on the more northerly and east slopes and in moist draws. Several of these areas are adjacent to the Kooskia and Stites city limits creating a significant wildland-urban interface fuel hazard. Grand fir and Douglas-fir with a small cedar component are common in these areas

Due to the steeper topography of the river corridor, fires in the light grass fuels would be expected to move very rapidly, especially under the influence of up canyon winds. The transition of native fuels to agricultural or pastureland around homes serves to break up fuel continuity and slow the spread. Additionally, fires in cultivated fields can be more quickly controlled by fuel modification.

Fires in denser fuel types are highly variable ranging from low intensity surface fires to very destructive; stand replacing wildfires depending on the fuel build up, topography, and local weather. Fire suppression over the past few decades has led to increased brush, regeneration, and other surface fuels in the understory, which can lead to more intense fires. Torching, crowning, and spot fires tend to occur more frequently under these conditions.

Infrastructure

One of the key components of the economy in Kooskia and Stites is the existence of Clearwater Forest Industries. The wood products industry has been one of the chief employers in this area for many decades. The loss of productive timber ground because of a large wildfire may affect the industry's ability to continue operating efficiently, especially in today's shrinking log markets.

The Clearwater Valley High School and Junior High School campus is located in the rural area adjacent to Clearwater Forest Industries along State Route 13.

Tourism is also an important component of Kooskia's economy. Travelers seeking adventure along the Lewis and Clark Trail pass through Kooskia on U.S. 12. Lodging, dining, and other recreational facilities have become relatively dependent on the flow of travelers during the warmer months. Warm weather also tends to bring campers, hikers, and other recreationalists into the area. Restricted access due to wildfires may negatively affect this cash flow.

Camas Prairie Railroad still transports logs and a few other products between Kooskia and Lewiston. The track mimics the path of the Clearwater River along its eastern bank. There has been no recent fire starts due to the passage of the train, yet the potential of ignition from sparks or hot brake shoes exists.

The Stites municipal water system has two wells that are located adjacent to the wildland interface on the east side of the community of Stites. The Kooskia municipal water system has four wells. Wells #1 and #2 are along the Middle Fork of the Clearwater River off Beach Drive. Well #3 is on Stewart Drive adjacent to the timbered north facing slope of Mount Stewart and Well #4 sits on the corner of the city park at Fourth Avenue and Front Street.

A set of power supply lines parallel the South Fork of the Clearwater River from the power substation on Depot Street in Kooskia. These cross an east aspect slope that is partly timbered and could be threatened by fire.

Escape

Kooskia is located at the junction of State Highways 13 and 12, both of which are two lane highways. Stites is accessed by traveling south from Kooskia on State Route 13. These highways follow the path of the river corridor and can be narrow and windy in several areas. These roadways are the sole paved routes between Kooskia and Stites and other population centers in Idaho County. Although much of these passages are bordered by light grass fuels, the river canyon is narrow enough that a fire on either side could restrict access due to extreme heat and fumes. In the event of a wildfire along the river, it is likely that this escape route would become impassable.

The most direct alternative escape route is the Winona Grade Road leading up to the Camas Prairie; however, this road is only suitable for high clearance vehicles and is located partially in a draw that has heavy fuel loadings and could be hazardous during a fire. There are numerous other secondary roads in the area that may serve as potential escape routes depending on the location of the fire.

Community Assessment

Like many valley bottom communities, Kooskia and Stites are not considered to be at high risk of wildfire due to the lack of heavy fuels and a readily available water source. However, residences located on the steeper slopes surrounding both towns have an increased risk for wildfire loss. A huge contributing factor is the lack of good access. Roads accessing these hillsides are primarily located in narrow draws, which may act as a funnel for heat and gases during a wildfire.

Generally speaking, homes east of the South Fork of the Clearwater River, have a higher fire risk. Structures are scattered on nearby slopes extending from the valley floor to the ridge top. Many of these slopes have aspects oriented south to west, further increasing the risk of loss due to rapidly spreading wildfires.

The location of the primary access routes in the bottom of a narrow canyon exacerbates already hazardous landscape characteristics. A fire on either side of the river would funnel hot gases and fumes through the canyon. Intense heat, sparks, or fire brands could easily light the opposite side; thus, compounding the threat. Additionally, there are only a few alternate escape routes available to residents.

Many landowners in the Kooskia-Stites area are grazing cattle, horses, and other livestock around homes, in pastures, and in the forest-range interface. These animals serve to eat the fine, porous grasses and shrubs, trample fine woody fuels, and keep the ladder fuels trimmed and thus reduce the fire risk in this interface area. Although this practice helps deflate the fire risk in this area, many other mitigation activities would significantly improve the survivability of this community in the event of a wildland fire.

Potential Mitigation Activities

Vegetation in this area should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

- Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.
- Prune trees to a minimum of 12 feet of all branches.
- Prune 1/3 of the live crown of smaller trees.
- Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.

- Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

Development of a community evacuation plan is necessary to assure an orderly evacuation in the event of a threatening wildland fire. Designation and posting of escape route signage would reduce chaos and escape times for fleeing residents. A community safety zone should also be established in the event of compromised evacuation. Efforts should be made to educate homeowners through existing homeowners associations or creation of such organizations to act as conduits for this information.

Other specific mitigation activities are likely to include improvement of emergency water supplies and management of trees and vegetation along roads and power line right-of-ways. Furthermore, building codes should be established to provide for more fire conscious construction techniques such as using fire resistant siding, roofing, and decking.

Recreational facilities near the community and along the Middle Fork and the South Fork of the Clearwater River should be kept clean and maintained. In order to mitigate the risk of an escaped campfire, escape proof fire rings and barbeque pits should be installed and maintained. Surface fuel accumulations in nearby forests can also be kept to a minimum by periodically conducting controlled burns. Other actions that would reduce the fire hazard would be thinning and pruning timbered areas, creating a fire resistant buffer along roads and power line corridors, and strictly enforcing fire-use regulations.

Access roads in these areas require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. The majority of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some of the housing developments in this area have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. The vast majority of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. High visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

Fire Protection

The Kooskia Fire Department and Stites Volunteer Fire Department provide local fire protection and primary response. These departments have Mutual aid agreements with each other, BPC Rural Fire District and the Idaho Department of lands. The local departments have primary responsibility for structural fire protection. The Idaho Department of Lands has primary responsibility of wildland fire suppression. The local departments provide initial wildland response in the area they cover. The Kooskia Fire Department station is located at 4th and Front Streets in Kooskia and has six bays housing seven vehicles. The Stites Volunteer Fire Department operates out of a station located on Main Street in Stites. Both departments are equipped for both structural and wildland fire suppression.

Probability of Future Occurrence

The probability of a wildland fire threatening Kooskia or Stites on an annual basis is moderate to high. Homes and other structures located adjacent to forestlands within or surrounding the community have a higher wildfire risk. Forestland fires generally have low to moderate rates of spread but can exhibit extreme fire behavior and intensity because of the fuel loads. Fires in this fuel type are considered difficult to suppress due to heavy fuels and access. Homes along the perimeter of the community would have the highest risk due to their adjacency to heavy fuel loads. The grasslands surrounding Kooskia and Stites have historically had a fire frequency of less than 35 years with low to mixed severity. While the forested areas surrounding Kooskia and Stites have historically had a fire frequency of 35 to 200 years with stand replacing severity. The current vegetation condition class surrounding both Kooskia and Stites suggests that there has been a moderate to high alteration of the vegetation in this area. This is likely attributed to grazing and logging uses and the associated effects, such as, invasive plant outbreaks.

Impacts of Wildland Fire Events

The potential impacts from a wildfire in either Kooskia or Stites are similar to the impacts described for Idaho County as a whole. All fires pose a significant safety risk to residents and emergency service personnel. Individual structures, property, and livelihoods could be severely damaged or lost as a result of a fire; however, the community is not likely to suffer severe or long-term economic losses.

A fire in the forestlands surrounding these communities may benefit the ecological environment as nutrients are recycled into the soil. Generally, grass and forbs are rejuvenated by a low intensity fire and grow back quickly; however, heavy rains immediately after a fire could cause erosion.

Smoke from a nearby wildland fire may impact sensitive populations within these communities due to degraded air quality conditions. Smoke and/or flames will also impact transportation corridors connecting Stites to other communities; thus, travel and commerce may be interrupted.

Value of Resources at Risk

It is difficult to estimate potential losses in Kooskia or Stites from wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is unlikely that more than a few structures or other properties within the city limits of Kooskia or Stites would be lost or damaged by a wildland fire; however, residents in the immediate vicinity may be directly impacted. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. Thus, no value estimates were made for this hazard.

City of Kamiah

Wildland Fire Profile

Kamiah is located at the junction of U.S. Highway 12 and State Highways 162 and 64 approximately seven miles north of Kooskia. Although many of the local businesses and infrastructure associated with the community are on the western bank of the Clearwater River, which is part of Lewis County, there are also many structures and significant infrastructure on the eastern bank in Idaho County. As Kamiah grows, more and more homes are being built along the steep slopes of the river canyon. Particularly noteworthy is the abundance of homes along the Beaver Slide Road, the Tom Taha Grade Road, and the Woodland Road. The economy in this part of the County is more focused on the lumber and tourism industries than agriculture.

Fuels Assessment

The Idaho County portion of Kamiah is spread along the base of the west aspect slope that defines the Clearwater River canyon. This slope is characterized by very patchy timber intermixed with grass and pasture lands. Drier habitat species such as ponderosa pine and Douglas-fir grow in open stands on this steep slope. Fires in this fuel type were historically frequent, but generally burned at low to moderate intensities. Fire suppression over the past few decades has led to increased brush, regeneration, and other surface fuels in the understory, which can lead to more intense fires. Torching, crowning, and spot fires tend to occur more frequently under these conditions. More moist and dense forest types are found in the Tom Taha Creek drainage. Douglas-fir, ponderosa pine, grand fir, and western red cedar with an abundance of ladder fuels in the understory are common along the creek and extending upwards on the north and south aspect slopes. Fires in these fuels are less frequent, but typically burn at much higher intensities than open forest stands.

The timber component of the system becomes much more continuous to the north and east, but transitions to a grassland habitat to the west. Fires in these grassland ecosystems cure early in the summer and become increasingly prone to ignition.

Infrastructure

Kamiah has both a municipal surface water system and ground water sources. Landowners outside of the city water district are generally supplied by personal or multiple home wells. The Kamiah Watershed could potentially be negatively impacted by a wildfire event; however, ground water sources would not likely be affected by a wildfire event.

High tension power lines run along the southwestern side of the community. Sections of these transmission lines cross over forest ecosystems. These lines have a moderate potential of sparking an ignition, particularly during severe wind events. Efforts should be made to ensure power line corridors are kept clear of fuels.

One of the key components of the economy in Kamiah is the existence of Empire Lumber Company and a few small sawmills. The wood products industry has been one of the chief employers in this area for many decades. The loss of productive timber ground because of a large wildfire may affect the mill's ability to continue operating efficiently, especially in today's shrinking log markets.

Camas Prairie Railroad still transports logs and a few other products between Kamiah and Lewiston. The track mimics the path of the Clearwater River along its eastern bank. This transportation route heavily influences Kamiah's economy. There have been no recent fire starts due to the passage of the train, yet the potential of ignition from sparks or hot brake shoes exists.

Tourism is also an important component of Kamiah's economy. Travelers seeking adventure along the Lewis and Clark Trail pass through Kamiah on U.S. 12. Lodging, dining, and other recreational facilities have become relatively dependent on the flow of travelers during the warmer months. Restricted access due to wildfires may negatively affect this cash flow.

Escape

The primary access into Kamiah is by U.S. Highway 12, part of the Lewis and Clark Trail. This two lane highway follows the path of the Clearwater River and can be very narrow and winding. State Highway 162 enters Kamiah from the southwest and is a narrow two lane highway that provides the quickest route from the Camas Prairie. Both Highway 12 and 162 could function as escape routes; however, it is possible that one or both would become impassable in the event of a fire. Sections of these roadways abut timber-type fuels and steep slopes. The Clearwater River canyon near Kamiah is narrow enough in several places that a fire on either side could shut down Highway 12 due to extreme heat and fumes. If both routes are disabled, there are several secondary roads on the Idaho County side of the river that could function as escape routes including Woodland Road and Tom Taha Road.

State Highway 64, also known as the Kamiah-Nez Perce Grade, is a very narrow and winding, primarily gravel, single lane road that climbs the steep canyon wall to the Camas Prairie above. This is not an adequate escape route. Not only does it lack suitable turnouts and guard rails, but there is also a history of ignitions along the roadway.

Community Assessment

The community of Kamiah is at moderate to high risk of experiencing a wildland fire, which has been recently demonstrated by the 2003 Milepost 59 Fire. Homes built on steep slopes or with timber directly abutting or overhanging structures are at the highest risk. Fires in these timber fuel types are generally much more intense and difficult to control than rangeland fires. Dry grasses on the steep slopes rising from the community center would support very rapidly spreading wildfires, leaving little time for residents to escape. Additionally, the abundance of recreational and other human activities in the area drastically increase potential ignition sources. Preparing a home prior to a wildfire event will significantly increase its chance of survival.

The location of the town site in the bottom of a narrow canyon exacerbates already hazardous landscape characteristics. A fire on either side of the river would funnel hot gases and fumes through the canyon. Intense heat, sparks, or fire brands could easily light the opposite side; thus, compounding the threat. Additionally, there are only a few safe escape routes available to residents.

Potential Mitigation Activities

Vegetation in this area should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

- Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.
- Prune trees to a minimum of 12 feet of all branches.
- Prune 1/3 of the live crown of smaller trees.
- Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.
- Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

Development of a community evacuation plan is necessary to assure an orderly evacuation in the event of a threatening wildland fire. Designation and posting of escape route signage would reduce chaos and escape times for fleeing residents. A community safety zone should also be established in the event of compromised evacuation. Efforts should be made to educate homeowners through existing homeowners associations or creation of such organizations to act as conduits for this information.

Other specific mitigation activities are likely to include improvement of emergency water supplies and management of trees and vegetation along roads and power line right-of-ways. Furthermore, building codes should be established to provide for more fire conscious construction techniques such as using fire resistant siding, roofing, and decking.

Recreational facilities near the community and along the Middle Fork and the South Fork of the Clearwater River should be kept clean and maintained. In order to mitigate the risk of an escaped campfire, escape proof fire rings and barbeque pits should be installed and maintained. Surface fuel accumulations in nearby forests can also be kept to a minimum by periodically conducting controlled burns. Other actions that would reduce the fire hazard would be thinning and pruning timbered areas, creating a fire resistant buffer along roads and power line corridors, and strictly enforcing fire-use regulations.

Access roads in these areas require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. The majority of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some of the housing developments in this area have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. The vast majority of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. High visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

Fire Protection

Structural fire protection is provided to Kamiah and the surrounding areas by the Kamiah City and Rural Fire Protection District. The Idaho Department of Lands-Maggie Creek District, USDA Forest Service, and the Nez Perce Tribe offer wildland fire protection.

Probability of Future Occurrence

The probability of a wildland fire threatening Kamiah on an annual basis is moderate to high. Homes and other structures located adjacent to forestlands within or surrounding the community have a higher wildfire risk. Forestland fires generally have low to moderate rates of spread but can exhibit extreme fire behavior and intensity because of the fuel loads. Fires in this fuel type are considered difficult to suppress due to heavy fuels and access. Homes along the perimeter of the community would have the highest risk due to their adjacency to heavy fuel loads. The grasslands surrounding Kamiah have historically had a fire frequency of less than 35 years with low to mixed severity. While the forested areas surrounding Kamiah have historically had a fire frequency of 35 to 200 years with stand replacing severity. The current vegetation condition class surrounding Kamiah suggests that there has been a moderate to high alteration of the vegetation in this area. This is likely attributed to grazing and logging uses and the associated effects, such as, invasive plant outbreaks.

Impacts of Wildland Fire Events

The potential impacts from a wildfire in Kamiah are similar to the impacts described for Idaho County as a whole. All fires pose a significant safety risk to residents and emergency service personnel. Individual structures, property, and livelihoods could be severely damaged or lost as a result of a fire; however, the community is not likely to suffer severe or long-term economic losses.

A fire in the forestlands surrounding the community may benefit the ecological environment as nutrients are recycled into the soil. Generally, grass and forbs are rejuvenated by a low intensity fire and grow back quickly; however, heavy rains immediately after a fire could cause erosion.

Smoke from a nearby wildland fire may impact sensitive populations within the community due to degraded air quality conditions. Smoke and/or flames will also impact transportation corridors connecting Stites to other communities; thus, travel and commerce may be interrupted.

Value of Resources at Risk

It is difficult to estimate potential losses in Kamiah from wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is unlikely that more than a few structures or other properties within the city limits of Kamiah would be lost or damaged by a wildland fire; however, residents in the immediate vicinity may be directly impacted. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. Thus, no value estimates were made for this hazard.

City of White Bird

Wildland Fire Profile

This small town is located one mile off the Salmon River along White Bird Creek at about 1,600 feet in elevation. The mountains surrounding it quickly rise to 5,000 feet with the timber line down to 2,000 feet on north slopes and 3,800 feet on south slopes. Ponderosa pine grows along the river in the shade of the mountains. The rangeland is plagued by yellow starthistle and cheat grass, but there are still native grasses mixed throughout.

Deer Creek Road takes off from the Swiftwater Bridge on the west side of the canyon west of White Bird. This road travels southwest over the ridge, then drops down to the Snake River on the other side. There are numerous homes and ranches all along this roadway up to the National Forest Boundary.

The Twin Rivers Subdivision, which is still under development, lies on the west side of the Salmon River in the Hammer Creek and lower Deer Creek area. These lots are typically riverfront views with limited access.

Fuels Assessment

The rangeland vegetation that covers most of the Salmon River canyon, including the slopes rising from the White Bird Creek drainage, is primarily made up of cured grasses with hay fields and pasture ground intermixed. Fires in rangeland fuels typically burn at low intensities, but spread very rapidly, especially under the influence of up canyon winds.

Ponderosa pine is present on the mid and upper slopes of the western canyon wall of the Salmon River. These stands tend to be relatively open with a grass and light brush understory. Over the past several years, this east aspect slope has been systematically logged in order to continue development of the Twin River subdivision. This area is at high risk for wildfire due to the increased human activity in combination with highly flammable rangeland fuels, slash build up from logging activity, and steep slopes.

Rangeland in the Salmon River canyon historically burned very frequently, which restored nutrients to the ecosystem and eradicated invasive species. Due to recent suppression policies and severe soil disturbance cheat grass and other nonnative species have become established. The fine structure of cheatgrass and its ability to completely dominate disturbed sites, provides a dry, consistent fuel bed for fire. In areas where this exotic has out competed native species, there is a consistent bed of fine fuels that can actively carry fire without the effect wind. These characteristics allow cheatgrass to support fire during times of the year, and under conditions, in which native vegetation would not typically sustain a wildland fire.

Infrastructure

Residents of city of White Bird rely on a community well system, while homeowners in the surrounding areas have personal or multiple home wells. These water resources are not likely to be severely affectedby wildfire.

Escape

The old U.S. Highway 95 passes directly through the White Bird community center. The reroute of Highway 95 bypasses the town site to the west via a large bridge across the White Bird Creek drainage. The primary access into the community center is a short spur road off the new U.S. 95 that connects to the old highway. The new U.S. 95 is the most direct route to and from the Salmon River canyon; however, the old highway can still be used to gain access to the Camas Prairie to the north. Both of these roadways are bordered by rangeland fuels; thus, it is unlikely that both would be disabled at the same time due to the short duration of fires typical in these fuels. Nevertheless, the Free Use Road and the Canfield Road could be used as alternative escape routes. These roads are also at low risk due to the lack of heavy fuels.

The Deer Creek Road is the sole access route for residents in the Deer Creek area. Most of this gravel route is fairly narrow and winding, traveling through rangeland fuels or pasture ground until it reaches the Nez Perce National Forest boundary near the summit.

The Twin Rivers Subdivision is accessed by Deer Creek Road and Canfield Road off the Old Highway 95 loop through Swift Water. Both of these access routes are narrow gravel roads, which may not support two-way truck traffic in several spots. Additionally, most homeowners have narrow private driveways with inadequate turnaround or turnout areas, which may limit emergency vehicle admittance.

Community Assessment

Although the White Bird town site is at relatively low risk of experiencing a wildfire; homes located along the steep slopes rising from either Salmon River or the White Bird Creek drainage are at much higher risk. Many homeowners in the Deer Creek area would be threatened in the event of a fire burning upslope on the west side of the river. If access to the river via the Deer Creek Road were compromised, residents would be forced to travel up the grade either to be airlifted or jet boated out of Pittsburg Landing or take Forest Road 672 along the ridge to either Lucile or Riggins.

The Twin River Subdivision on the west side of the Salmon River is at particularly high risk. Since the development of the subdivision several years ago, there have been numerous fires in the area, and on at least four of those occasions, structures were threatened. On one occasion, a fire came so close that scorch marks were left on a home. Idaho County currently has no planning and zoning laws in place; however, cooperation through local fire response agencies has resulted in a small fire education program for Twin River residents. The combination of light fuels and high fire occurrence on these steep slopes make it imperative that homeowners implement fire mitigation measures to protect their structures and families prior to such an event. The Hells Canyon National Recreation Area lies only two air miles south of the subdivision. The Wallowa-Whitman National Forest has jurisdiction over these lands; however, the less than aggressive initial attack that is practiced in natural areas could become a significant threat to homeowners in the Twin River development. A fire spreading over the ridge from the Hells Canyon area could result in multiple spot fires on the Salmon River side.

In 2000, landowners in the White Bird Creek drainage northeast of White Bird realized the importance of defensible space as the Burnt Flats Fire nearly caused an evacuation of the entire town. This fire burned 25,000 acres of forest and rangeland before it was contained. Additionally, the Poe-Cabin fire in 2007 threatened numerous homes and structures in the Salmon-River canyon south of White Bird. A fuels mitigation project started in 2004 and finished two years later resulted in all treated homes surviving a severe crown fire event. Evaluations of home sites conducted after the fire led to the production of the video, "Are We Safe from Fire?", currently being used nationally and on the internet.

As more and more homes are built in the wildland urban interface, particularly in the Twin River subdivision, pre-fire mitigation activities will become increasingly important. Due to the nature of the topography, many of these structures are accessed by one-way in, one-way out driveways, which are not conducive to effective fire protection and dramatically increases the likelihood of loss of life or property in the event of a wildland fire. These homes and other buildings are at much higher risk of experiencing a fire.

The primary fire risk is associated with the abundance of human activity and the use of machinery near dry, flashy fuels. The receptive nature of these fuels increases the likelihood of a fire start.

Potential Mitigation Activities

Vegetation in this area should be managed to increase the effectiveness of fire suppression equipment in the event of a wildland fire. Plantings near homes should use fire resistant landscaping and be well spaced. Grass surrounding homes and other buildings should be kept short and watered if possible. Other possible management actions include:

- Remove weak, dying, and sick trees, thin standing trees to create crown openings spaced to approximately 10 feet between crowns.
- Prune trees to a minimum of 12 feet of all branches.
- Prune 1/3 of the live crown of smaller trees.
- Remove ladder fuels that may carry fire into the crowns of larger, overstory trees.
- Dispose of all excess vegetative material by chipping or hand-piling and burning when conditions are favorable.

Development of evacuation plans for the residents located in the small creek drainages around White Bird is necessary to assure orderly evacuations in the event of a threatening wildland fire. Designation and posting of escape routes would reduce chaos and escape times for fleeing residents. Most residents would benefit from the construction of additional escape routes to Highway 95. Community safety zones should also be established in the event of a compromised evacuation. Efforts should be made to educate homeowners through existing homeowners associations or creation of such organizations to act as conduits for this information.

Grazing generally works positively towards reducing the fine fuels in the vegetation types surrounding White Bird, particularly in rangeland areas and open forest stands with grass and brush in the understory. Many landowners already graze livestock in areas that would otherwise be more susceptible to carrying a wildland fire. Grazing is a relatively inexpensive fire mitigation tool that typically works very well with little negative impact on the land.

Access roads in these areas require additional treatments to ensure a viable escape route for residents while simultaneously providing for access by emergency vehicles. The majority of the homes in the wildland-urban interface (situated within the range and forest lands) have multiple entrances and exits from their homes and businesses. The vegetation surrounding these access points should be trimmed and disposed of in such a way to allow easy access to and from homes. Site specific treatments should be developed for each home and subdivision.

In addition, some of the housing developments in this area have access roads that cannot support water trucks used by fire fighters (rural and wildland). Some roads have steep adverse grades, while others have turning radii that would be difficult for large trucks to navigate. Some roads have both limitations. The vast majority of the bridges observed in the area would support water-laden trucks. Roads in developments should be signed to allow emergency vehicles to plot a route over navigable roads while responding to an emergency. High visibility address markers at driveways would improve accurate emergency vehicle response during fire or other incidents.

Fire Protection

The White Bird Volunteer Fire Department is responsible for structural fire protection in the city of White Bird. Salmon River Rural Fire Department and White Bird Volunteer Fire Department have an automatic response agreement for the area surrounding the city.

Probability of Future Occurrence

The probability of a wildland fire threatening White Bird on an annual basis is moderate to high. Homes and other structures located adjacent to rangelands within or surrounding the community have a high wildfire risk. Rangeland or grass fires are often the most dangerous due to high rates of spread. Fires in this fuel type are considered somewhat easier to suppress given the appropriate resources, but they can also be the most destructive. Homes along the perimeter of the community would have the highest risk due to their adjacency to flashy fuels. The rangeland areas surrounding Riggins have historically had a fire frequency of less than 35 years with low to mixed severity. The current vegetation condition class surrounding White Bird suggests that there has been a moderate to high alteration of the vegetation in this area. This is likely attributed to grazing practices and the associated effects, such as, invasive plant outbreaks.

Impacts of Wildland Fire Events

The potential impacts from a wildfire in White Bird are similar to the impacts described for Idaho County as a whole. All fires pose a significant safety risk to residents and emergency service personnel. Individual structures, property, and livelihoods could be severely damaged or lost as a result of a fire; however, the community is not likely to suffer severe or long-term economic losses.

A fire in the rangelands surrounding the community may benefit the ecological environment as nutrients are recycled into the soil. Generally, grass and forbs are rejuvenated by a low intensity fire and grow back quickly; however, heavy rains immediately after a fire could cause erosion.

Smoke from a nearby wildland fire may impact sensitive populations within the community due to degraded air quality conditions. Smoke and/or flames will also impact transportation corridors connecting Riggins to other communities; thus, travel and commerce may be interrupted.

Value of Resources at Risk

It is difficult to estimate potential losses in Riggins from wildland fire due to the unpredictability of wildfire behavior and the nature of ignition sources. It is unlikely that more than a few structures or other properties within the city limits of Riggins would be lost or damaged by a wildland fire; however, residents in the immediate vicinity may be directly impacted. It is impossible to forecast the path a wildfire will take and what type of assets and resources, manmade and ecological, will be at risk. Thus, no value estimates were made for this hazard.

Chapter 9

Mitigation Strategy

IN THIS SECTION:

- Prioritization of Action Items
- Idaho County Annex
- City of Grangeville Annex
- City of Ferdinand Annex
- City of Cottonwood Annex
- City of Riggins Annex
- City of Kooskia Annex
- City of Kamiah Annex
- City of White Bird Annex

This Page Intentionally Left Blank

Chapter 9 – Mitigation Strategy

Administration and Implementation of Action Items

Critical to the implementation of this Multi - Hazard Mitigation Plan will be the identification and implementation of an integrated schedule of action items. These action items are targeted at achieving an elimination of lives lost, a reduction in structures destroyed or compromised, and the preservation of unique ecosystems that serve to sustain the way of life and economic stability in Idaho County, Idaho. Since there are many management agencies and thousands of private landowners in this area, it is reasonable to expect that differing schedules of adoption will be made and varying degrees of compliance will be observed across all ownerships.

All risk assessments were made based on the conditions existing during 2014/2015; thus, the recommendations in this section have been made in light of those conditions. However, the components of risk and the preparedness of the Counties' resources are not static. It will be necessary to fine-tune this Plan's recommendations annually to adjust for changes in the components of risk, population density changes, infrastructure modifications, and other factors.

Mechanisms to Incorporate Mitigation Strategies

Idaho County and the incorporated cities encourage the philosophy of instilling disaster resistance in normal day-to-day operations. By implementing plan activities through existing programs and resources, the cost of mitigation is often a small portion of the overall cost of a project's design or program. Through their resolution of adoption as well as their participation on the planning committee, each jurisdiction is aware of and committed to incorporating the risk assessments and mitigation strategies contained herein. It is anticipated that the research, local knowledge, and documentation of hazard conditions coalesced in this document will serve as a tool for decision-makers as new policies, plans, and projects are evaluated.

There are several planning processes and mechanisms in Idaho County that will either use the risk assessment information presented in this document to inform decisions or will integrate the mitigation strategy directly into capital improvement, infrastructure enhancement, and training projects; prevention campaigns; and land use and development plans. Although not inclusive, the following is a list of mechanisms available to each jurisdiction for incorporating the mitigation requirements:

This Page Intentionally Left Blank

Idaho County Mechanisms

1. Subdivision Ordinances
2. Zoning Ordinances
3. Departmental Budgets
4. Site Master Plans (wastewater treatment, landfill, etc.)
5. Personnel Training Programs

Table 9.1. Idaho County Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Department of Public Works	Floodplain Management			X		Clean gutters, storm drains and culverts as needed
Solid Waste Department	Sanitation			X		Responsible for removal of debris after an event
Road & Bridge Department	Transportation			X		Road, bridge, and culvert repairs
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
				X		

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074				Outlines emergency response procedures during and after a disaster
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activities
Idaho Bureau of Homeland Security	State Multi-Hazard Mitigation Plan	Duty Officer 4040 Guard St., Bldg.600 Boise, Idaho 83705-5004 (208)-422-3040		X		Idaho County will rely on State assistance if necessary
Idaho Bureau of Homeland Security	State Emergency Operations Plan	Duty Officer 4040 Guard St., Bldg.600 Boise, Idaho 83705-5004 (208)-422-3040		X		Idaho County will rely on State assistance if necessary

Incorporated City Mechanisms

1. Transportation Plans
2. City Budgets
3. Building Codes and Ordinances
4. Site Master Plans (airport, business incubators, etc.)

Table 9.2. Cottonwood Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activities. City will rely on County for support if needed

Table 9.3. Ferdinand Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activities. City will rely on County for support if needed

Table 9.4. Grangeville Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Transportation	Highway Maintenance	Idaho transportation Department 3311 W. State St. Boise, ID 83707 (208)-334-8000	X			Keep roads in acceptable condition
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville,		X		Guides planners during wildfire mitigation activities. City will rely on County for support if needed

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
		Idaho 83530 (208)983-3074				

Table 9.5. Kamiah Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activities. City will rely on County for support if needed

Table 9.6. Kooskia Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activities. City will rely on County for support if needed

Table 9.7. Riggins Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activites. City will rely on County for support if needed

Table 9.8. Stites Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activites. City will rely on County for support if needed

Table 9.9. White Bird Local Mitigation Capability Assessment

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding, or Practices	Point of Contact Name, Address, Phone, Email	Effect on Loss Reduction			Comments
			Support	Facilitate	Hinder	
Idaho Department of Water Resources	Stream Channel Protection Program	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within stream channels
Idaho Department of Water Resources	Floodplain Management	Western Regional Office 2735 Airport Way Boise, ID 83705 (208)-334-2190			X	Oversees activities within floodplains
Idaho County Emergency Management	Emergency Operations Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Outlines emergency response procedures during and after a disaster. City will rely on County for support if needed
Idaho County Emergency Management	Multi-Hazard Mitigation Plan	Jerry Zumalt Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during hazard mitigation activities. City will rely on County for support if needed
Idaho County Emergency Management	Community Wildfire Protection Plan	Randy Doman Idaho County Courthouse 320 W. Main St. Grangeville, Idaho 83530 (208)983-3074		X		Guides planners during wildfire mitigation activities. City will rely on County for support if needed

Hospital District Mechanisms

1. Emergency Operations Plan
2. Annual Budget
3. Board of Directors Bylaws (Operational Protocols)

Agencies and other Organization Mechanisms

1. Annual Budget
2. Prevention Programs
3. Training Programs
4. Long Term Land Use Plans (Forest Plans, Wildlife Management Area Plans, etc.)

The Idaho County Disaster Management Coordinator is responsible for educating the Board of Commissioners and other County departments as well as city planners on the contents and incorporation requirements of the Multi-Hazard Mitigation Plan. The Disaster Management Coordinator and other planning committee partners should be aware of the risk assessments and mitigation strategies respective to their jurisdictions in order to include them in the planning processes and discussions for other types of projects as they come up. The Idaho County Disaster Management Coordinator is responsible for ensuring that each participating jurisdiction as well as other partners has a copy of the Multi-Hazard Mitigation Plan readily available for reference purposes. Furthermore, as previously mentioned, the Idaho County Disaster Management Coordinator is responsible for annual and 5-year evaluations of the Multi-Hazard Mitigation Plan. The annual meetings will serve a dual purpose of updating the document and refreshing each jurisdiction's memory of the contents and mitigation requirements of Multi-Hazard Mitigation Plan. Members of the planning committee are also responsible of educating decision-makers in their own jurisdictions on the use and incorporation of mitigation requirements of this document into other planning mechanisms such as those listed above.

Prioritization of Action Items

The prioritization process includes a special emphasis on benefit-cost analysis review. The process reflects that a key component in funding decision is a determination that the project will provide an equivalent or more in benefits over the life of the project when compared with the costs. Projects will be administered by local jurisdictions with overall coordination provided by the Idaho County Disaster Management Coordinator.

County Commissioners and the elected officials of all jurisdictions have evaluated opportunities and established their own unique priorities to accomplish mitigation activities where existing funds and resources are available and there is community interest in implementing mitigation measures. If no federal funding is used in these situations, the prioritization process may be less formal. Often the types of projects a county can afford to do on their own are in relation to improved codes and standards, department planning and preparedness, and education. These types of projects may not meet the traditional project model, selection criteria, and benefit-cost model. Idaho County will use this Multi-Hazard Mitigation Plan as guidance when considering pre-disaster mitigation proposals brought before the Board of Commissioners by department heads, city officials, fire districts, and local civic groups.

When federal or state funding is available for hazard mitigation, there are usually requirements that establish a rigorous benefit-cost analysis as a guiding criterion in establishing project priorities. Idaho County understands the basic federal grant program criteria which will drive the identification, selection, and funding of the most competitive and worthy mitigation projects. FEMA's three grant programs (the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program) that offer federal mitigation funding to state and local governments all include the benefit-cost and repetitive loss selection criteria.

The prioritization of new projects and deletion of completed projects will occur annually and be facilitated by the Idaho County Disaster Management Coordinator and the joint planning committee. All mitigation activities, recommendations, and action items mentioned in this document are dependent on available funding and staffing.

Prioritization Scheme

All of the action items and project recommendations made in this Plan were prioritized by each respective jurisdiction in coordination with their governing body. Each jurisdiction's representative on the planning committee met with their governing bodies and prioritized their own list of projects and mitigation measures through a group discussion and voting process. Although completed individually, each jurisdiction's mitigation strategy was discussed and analyzed on the merits described in the STAPLEE process including the social, technical, administrative, political, legal, economical, and environmental factors associated with each recommended action item. Projects were ranked on a "High", "Moderate", or "Low" scale with emphasis on project feasibility and the benefit/cost correlation. Once completed, the individual jurisdiction's rankings were discussed and approved at the committee level.

Jurisdictional Mitigation Strategies

The following tables outline all of the participating jurisdictions' mitigation strategies for at least the next five year period. All of the action items from the 2005 Plan were carried into the updated mitigation strategies; however, the committee thoroughly reviewed and discussed each proposed project, and in some cases, chose to revise the action item or delete it altogether. The "2012 Status" column in each table highlights the current state of each action item.

Idaho County Annex

Table 9.10. Idaho County Mitigation Strategies.

Hazard	Action Item	Goals Addressed	Responsible Departments or Organizations	2015 Status	Potential Resources	Projected Completion Year
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-1.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5, & 8 Priority Ranking: High	Idaho Department of Disaster Management	Incomplete	Idaho County, cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Kamiah, Grangeville, and Kooskia, USFS, BLM, IDL, Public Health Dept., fire depts., and local schools.	On-going
Flood	**6.10-2.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5,6, & 8 Priority Ranking: High	Idaho County	Incomplete	Cities of; Stites, Ferdinand, Riggins, White Bird, Kamiah, Cottonwood, Grangeville, and Kooskia.	On going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-3.** Promote use of appropriate building materials used in high risk WUI areas on existing structures and new construction.	Goal #1,4,5,6, & 8 Priority Ranking: High	Idaho County Commissioners	Incomplete	Chiefs' association, Fire Districts, IDL, BLM, USFS, County extension, Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-4.** Update County's list of available emergency shelters.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Completed (continue)	Cities of; Stites, Ferdinand, Riggins, White Bird, Kooskia, Cottonwood, Grangeville, Kamiah, and unincorporated communities.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-5.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	Short Term
Wildfire	**6.10-6.** Explore ways for the County to help not-for-profit fire department organizations to gain insurance coverage.		Idaho County	Completed		

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-7.** Develop phone tree emergency contact system to contact Pine Ridge Water and Sewer District subscribers during emergency situations.	Goal #1,3,5, & 8 Priority Ranking: High	Pine Ridge Water and Sewer District	Incomplete	Dispatch, Kamiah rural Fire District	Short Term
Landslide and Earthquake	**6.10-8.** Coordinate with Idaho Transportation Department to develop a detailed plan for mitigating landslide issues along U.S. Highway 95 through the Salmon River canyon.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Idaho Transportation Department, Adams County	Long Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-9.** Assess failure risk of bridges that may cause isolation of communities and identify alternative routes in high risk areas.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho Transportation Department	Incomplete	Idaho County, County Highway Districts	On going
General	**6.10-10.** Consider development of a countywide Resource Management Plan to help guide land use and development throughout Idaho County.	Goal #1,3,5, & 8 Priority Ranking: Moderate	Idaho County Commissioners	New Item	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	2017

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-11.** Continue development of a countywide Emergency Operations Plan.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Completed (continue)	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-12.** Continue development of Mass Fatalities Plan to help determine individual responsibilities during an event.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management/ District 2 Public Health	Completed	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-13.** Support continued development of Idaho County school districts' Emergency Response Plans.	Goal #1,3,5 & 8 Priority Ranking: High	Cottonwood Joint District #242, Mountain View District #244, Kamiah District #304, and Salmon River Joint District #243	Partially completed	Idaho County Disaster Management	Short Term

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-14.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County	Partially completed	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-15.** Coordinate countywide Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Disaster Management	Partially completed	Idaho Transportaion Department and the cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going
Severe Weather	**6.10-16.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Idaho County	Current	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-17**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout the County and Cities (particularly Cottonwood and Grangeville) for use with a portable generator.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Idaho County	Incomplete	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, Kooskia, and local fire districts.	Immediate Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-18.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	Immediate On-going
Wildfire	**6.10-19.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5,8,9,10, &11 Priority Ranking: High	Idaho County	Incomplete	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-20.** Remodel and update Idaho County Dispatch Center to provide for new technologies and more efficient personnel use.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County	Completed		On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-21.** Address utility failure and backup power facilities at North Idaho Correctional Institute. Obtain generators for housing units and kitchen.		North Idaho Correctional Institute	Completed		
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-22.** Develop a process to identify and update emergency shelters throughout the county.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Red Cross, Faith based organizations, Fire Districts, Idaho County Fair Board	2016

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-23.** Purchase portable "Emergency Evacuation Route" signs to be placed along primary and secondary routes during an emergency evacuation.	Goal #1,3,5 & 8 Priority Ranking: Low	Idaho County Disaster Management	Omitted	Fire districts, police departments, Sheriff's office	
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-24.** Obtain backup power generators for public water systems.	Goal #1,3,5 & 8 Priority Ranking: High	Cities of; Stites, Ferdinand, Riggins, White Bird, Kamiah.	Incomplete	Idaho County	Short Term
Wildland Fire	**6.10-25.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9,10, &11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and cities of; Stites, Ferdinand, Riggins, White Bird, Kooskia Cottonwood, Kamiah, and Grangeville.	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Floods and Severe Weather	**6.10-26.** Install or replace storm water drains and/or systems where needed throughout the County and Cities to help reduce flooding potential.	Goal #1,3,5 & 8 Priority Ranking: High	Cities of Stites, Ferdinand, Riggins, White Bird, Cottonwood, Kamiah, Grangeville, and Kooskia.	Incomplete	Idaho County	On-going
Flood and Earthquake	**6.10-27.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Cities of Stites, Ferdinand, Riggins, White Bird, Cottonwood, Kamiah, Grangeville, and Kooskia.	Incomplete	Idaho County	On going
Earthquake	**6.10-28.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5 & 8 Priority Ranking: Low	Idaho County	Incomplete	Cities of; Stites, Ferdinand, Riggins, White Bird, Kooskia Cottonwood, Grangeville, and Kamiah.	Long Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-29.** Replace old water storage tanks with larger capacity tanks where needed.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Cities of; Stites, Ferdinand, Riggins, White Bird, Kooskia Cottonwood, Elk City, Grangeville, and Kamiah.	Incomplete	Idaho County	Long Term

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-30.** Research and fund installation of next generation 911 system (associated equipment and system maintenance costs) countywide or, possibly in a multi-county area, as is appropriate and financially feasible.		Idaho County Disaster Management	Completed "Enhanced 911" as well as IPAWS. (continue with next generation upgrades)	Cities of; Stites, Ferdinand, Riggins, White Bird, Kooskia Cottonwood, Grangeville, and Kamiah.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-31.** Research and fund installation of Reverse 911 system countywide as is appropriate and financially feasible.		Idaho County Disaster Management	Completed IPAWS	Cities of; Stites, Ferdinand, Riggins, White Bird, Kooskia Cottonwood, Grangeville, and Kamiah.	
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-32.** Improve radio infrastructure and communication capability between Riggins and White Bird and Idaho County Sheriff's Office.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Idaho County Sheriff's Office	Partially completed	City of Riggins and city of White Bird	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-33.** Continue to upgrade infrastructure and improve communication interoperability countywide.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Sheriff's Office	Partially completed	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia, and local fire districts.	On-going
Flood	**6.10-34.** Conduct evaluation and implement a strategy to manage ice and debris jams along the South and Middle Forks of the Clearwater River.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Idaho County and City Public Works, and Highway Districts.	Partially completed	NICI, City Police Departments, County Sheriff's Office	Long Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-35.** Encourage the installation of additional cellular towers throughout Idaho County, particularly along the main transportation corridors.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County	Partially completed	Cities of; Stites, Ferdinand, Riggins, White Bird, Kamiah, Cottonwood, Nez Perce Tribe, Grangeville, Kooskia, and private residents.	Short Term

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-36.** Identify opportunities for regional communication facility planning, system upgrades, and co-location or consolidation of services as is appropriate and feasible to improve public safety service delivery efficiency and effectiveness.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County	Partially completed	Idaho Bureau of Homeland Security	On-going
Wildfire	**6.10-37.** Continue to improve fire department participation in Red Zone program.		Idaho County Disaster Management	Omitted	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia, and local fire districts.	
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-38.** Enhance FD-Disp radio communication capability in each fire district, link in to existing dispatch, improve range within the region, and convert to a consistent standard of radio types.			Completed	Idaho County and local fire departments and districts	

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-39.** Continue to develop and maintain existing mutual aid agreements between rural fire districts, finalize the countywide cooperative rural fire memorandum of understanding, and promote agreements with adjoining counties and federal and state land management agencies with jurisdictions in Idaho.	Goal #1,3,5,8,10, & 11 Priority Ranking: High	Idaho County		Local fire departments and districts, EMS units, BLM, USFS, BIA, IDL, Nez Perce Tribe, and State Fire Marshal's office.	On-going
Wildfire	**6.10-40.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8,10, & 11 Priority Ranking: High	Local fire departments	Partially completed	Idaho County and cities of; Stites, Ferdinand, Riggins, White Bird, Kamiah, Cottonwood, Grangeville, and Kooskia.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-41.** Update North Idaho Correctional Institute's fire control equipment and install working fire alarm/alert systems in applicable campus buildings.		North Idaho Correctional Institute	Completed		

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-42.** Address and obtain funding for fire department resource and capability enhancements through Federal Excess Property.	Goal #1,3,5,8, 10, & 11 Priority Ranking: High	Local fire departments/ districts and Idaho Department of Lands	On-going	Idaho County	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-43.** Identify and support improved emergency service care delivery options for relatively isolated and/or underserved communities in Idaho County (i.e. Riggins and Elk City).	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County	Partially completed	Cities of; Riggins and White Bird, unincorporated communities, Life Flight, Syringa General Hospital, St. Maries Hospital, and McCall Memorial Hospital	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-44.** As required and applicable, establish an agreement between local highway districts and North Idaho Correctional to adequately address road access during winter storm, wildland fire, and other critical emergencies.			Completed	North Idaho Correctional Institute, Cottonwood Highway District	

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-45.** Address and obtain funding for each highway districts' resource and capability enhancements.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Idaho County Highway Districts		Idaho County	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-46.** Continue improving County mapping capabilities including data acquisition, compatibility with CAD dispatch database, and generation of map books for distribution in real time.		Idaho County	Completed		
Wildfire, Landslide	**6.10-47.** Work with federal agencies to establish the Elk City Wagon Road as a seasonal alternate evacuation route.		Idaho County Road and Bridge	Omitted	USFS, BLM, Community of Elk City	
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-48.** Improve redundancy of power supply to Riggins and Elk City areas to help lessen the frequency of outages.		Idaho County	Omitted	City of Riggins, Community of Elk City, Idaho Power	

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Earthquake, Landslide	**6.10-49.** Assess and implement a plan to remove overhanging bluff on Graves Creek Road.	Goal #1,3,5 & 8 Priority Ranking: Low	Keuterville Highway District	Incomplete	BLM	On going
Landslide	**6.10-50.** Develop and implement a strategy for mitigating landslide issues along Graves Creek Road.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Keuterville Highway District	Partially completed		On-going
Flood, Landslide	**6.10-51.** Work with local landowners and agencies to implement a strategy to remove excess vegetation and other debris and improve channel stability on Graves Creek to help prevent flooding and erosion.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Keuterville Highway District	Patially completed	Idaho County, Fenn Highway District, Conservation District, and private landowners	On-going
Landslide	**6.10-52.** Fix recurring sloughing that occurs at the intersection of Rice Creek Grade and Center Canyon.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Doumecq Highway District	New Item	Idaho County and Idaho Transportation Department	2020

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**6.10-53.** Raise the top elevation of the existing Elk City lagoon dikes to prevent structural and environmental damage during a flood event or relocate the lagoons away from Big Elk Creek	Goal #1,3,5 & 8 Priority Ranking: High	Elk City Water and Sewer Association	New Item	Idaho County, Department of Commerce, USDA-RD, IDEQ, and Army Corps of Engineers	2018
Wildfire	**6.10-54.** Rapid River subdivision needs to update their water system to include; new well, distribution system, and hydrants.	Goal #1,3,5 & 8 Priority Ranking: High	Rapid River subdivision	New Item	Idaho County, Salmon River Rural VFD,	2017
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-55.** Provide funding for a full-time Geographic Information System position at the Idaho County Courthouse.		Idaho County Commissioners	Completed	Idaho County Planning and Zoning	On-going
Wildfire	**6.10-56.** Adoption of International Fire Code.	Goal #1,3,5,6 & 8 Priority Ranking: High	Idaho County Commissioners	Incomplete	Idaho County Rural Fire Districts	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-57.** Develop fire and emergency prevention plans for local communities.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Rural Fire District	Incomplete	Fire prevention specialists, Local communities and Home Owners' Associations	On-going
Wildfire	**6.10-58.** Promote Firewise communities throughout the county.	Goal #1,3,5,8, 10, & 11 Priority Ranking: High	Idaho County Rural Fire District	Incomplete	Fire prevention specialists, Local communities and Home Owners' Associations	On-going
Wildfire	**6.10-59.** Acquire West Wide Wildfire Risk Assessment (WWA).	Goal #1,3,5,8, 10, & 11 Priority Ranking: High	Idaho County Commissioners	?	Idaho County Disaster Management	?
Wildfire	**6.10-60.** Wildfire risk assessments of homes in identified communities.	Goal #1,3,5,8, 10, & 11 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Individual communities, Rural Fire Districts	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-61.** Home site WUI and defensible space treatments.	Goal #1,3,5,8, 10, & 11 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Individual communities, Rural Fire Districts	On-going
Wildfire	**6.10-62.** Maintenance or re-entry of Home Site WUI and defensible space treatments	Goal #1,3,5,8, 10, & 11 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Individual homeowners, Rural Fire Districts	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-63.** Development of "Community Emergency Response Team" program in communities.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Cities of Grangeville, Ferdinand, Cottonwood, Riggins, Kooskia, Kamiah, Stites, and White Bird	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-64.** Develop a multijurisdictional Prevention Coop to support the numerous fire prevention and education efforts throughout the five county area.	Goal #1,3,5,8 & 10 Priority Ranking: Moderate	Idaho County Disaster Management	Incomplete	University of Idaho, IDL, state and private forestry offices, Nez Perce Tribe, Idaho Association of Logging Contractors, local fire districts, USFS, Clearwater RC&D, IBHS, Non-profit organizations, private businesses, and landowners.	
Severe Weather, Flood, Wildfire, Earthquake, TCU	**6.10-65.** Establish Selway Falls Road as an alternate FEMA "Emergency Evacuation Route" for Elk City residents and visitors.	Goal #1,3,5 & 8 Priority Ranking: Low	Idaho County Commissioners	Incomplete	Idaho County Highway Districts, Rural Fire Districts, BLM, and USFS.	2018
Severe Weather, Flood, Wildfire, Earthquake, TCU	**6.10-66.** Fuels reduction project for power line corridor between Grangeville and Elk City.	Goal #1,3,5,8, 10 & 11 Priority Ranking: Moderate	Avista Utilities	Incomplete	USFS	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-67.** Fuels mitigation of the FEMA "Emergency Evacuation Routes" in the county to ensure these routes can be maintained in the case of an emergency.	Goal #1,3,5,8, 10 &11 Priority Ranking: Moderate	Idaho County Disaster Management	Incomplete	Idaho County Commissioners, Rural Fire Districts, and County Highway Districts	On-going
Severe Weather, Flood, Wildfire, Earthquake, TCU	**6.10-68.** Access improvements of bridges, cattle guards, culverts, and limiting road surfaces (e.g. Salmon River Road, Selway Falls Road, Pardee Road, Salmon River Road, Wilson Road, Forest Road 1858 to Newsome, Crooked River Road, Jack Mountain Road, Cove Road, Warren Wagon Road, and Forest Road 246).	Goal #1,3,5 & 8 Priority Ranking: High	County Highway Districts	Partially Complete	BLM, USFS, industrial forest land owners, IDL, and IDT	On-going

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-69.** Access improvements through road-side fuels management in proposed project areas. Specifically address access issues to Clearwater, Kooskia, Stites, Warren, Burgdorf, Dixie, Elk City, Harpster, Woodland, Pardee, Caribel, Glenwood, and others identified in assessment, such as Selway Falls Road and the Highway 14 corridors.	Goal #1,3,5,8, 10 & 11 Priority Ranking: Moderate	County Highway Districts	Incomplete	BLM, USFS, IDL, IDT, and industrial private forestland owners	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-70.** Obtain structural engine, four-wheel drive utility vehicles, portable pumps, handheld radios, personal protective equipment, and chainsaws for Ridge Runner Fire Department.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Ridge Runner Fire Department	Partially Complete	IDL and BLM	2018

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-71.** Acquire structural engine, brush truck, wildland engine, water tender, P25 radios, hand tools, flares, portable pump, foam unit, and miscellaneous other equipment for Harpster Fire Protection District.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Harpster Fire Protection	Partially Complete	Idaho County Disaster Management	2017
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-72.** Acquire construction materials for Elk City Volunteer Fire Department.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Elk City VFD	Partially Complete	Idaho County Disaster Management	2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-73.** Acquire six-wheel drive structural engine, drop tank, hoses, a 500 gpm pump, updated rolling stock, and training videos for Elk City Volunteer Fire Department.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Elk City VFD	Partially Complete	Idaho County Disaster Management	2017

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-74.** Retention and recruitment of volunteer firefighters.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Rural Fire Districts	Incomplete	Idaho County Disaster Management	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-75.** Increased training and capabilities of firefighters.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Rural Fire Districts	Incomplete	USFS, BLM, IDL, and State Fire Marshal's Office	On-going
Wildfire	**6.10-76.** Obtain wildland engine, hand tools, handheld radios, portable tank, portable pumps, blower fan, and flares for BPC Volunteer Rural Fire Department.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	BPC Volunteer Rural Fire Districts	Partially complete	IDL and BLM	2017

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-77.** Establish and map onsite water sources such as dry hydrants or underground storage tanks for rural housing developments.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Rural Fire Districts	Incomplete	Idaho County Commissioners	2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-78.** Create South Fork Clearwater River Volunteer Fire Department, and develop training schedule and provide equipment (portable pump, hose, hand tools, sprinkler systems) for SFCR VFD.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Idaho County Commissioners	Incomplete	Clearwater RC&D, IDL, USFS, BLM, local citizens	2020
Wildfire	**6.10-79.** Acquire and locate three 300 gallon slip tanks for the South Fork Clearwater River Volunteer Fire Department and provide training on its use	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	South Fork Clearwater River VFD	Incomplete	Idaho County Commissioners, Clearwater RC&D, IDL, USFS, BLM, and local citizens	2018
Wildfire	**6.10-80.** Acquire new heated building, pumper truck, and 3000 gallon water tender for Elk City Volunteer Fire Department.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Elk City Fire Department	Incomplete	Idaho County Commissioners and Elk City Council	2020

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-81.** Purchase small boat for IDL to access remote sections of the Clearwater River in the event of a wildfire.	Goal #1,3,5,8, & 10 Priority Ranking: Low	Maggie Creek FPD	Incomplete		2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-82.** Improve safety equipment for all RFDs in Idaho County.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Clearwater Resource Conservation and Development Council	Incomplete	Idaho County Commissioners and Rural Fire Districts	2017 On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**6.10-83.** Obtain mobile repeater stations with backup power source.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Idaho County Commissioners	Incomplete	Idaho County Sheriff's Office, Clearwater RC&D, IDL, USFS, and local fire departments	2017
Wildfire	**6.10-84.** Obtain funding to build a fire station and acquire a foam unit for the Secesh Meadows Rural Fire District.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Secesh Meadow Rural Fire District	Partially Complete	Idaho County Disaster Management	2017

Table 9.10. Idaho County Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**6.10-85.** Obtain updated rolling stock, PPE's and P25 radios for Salmon River Rural Fire Department.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Salmon River Rural Fire Department	Partially Complete		2016
Wildfire	**6.10-86.** Identify areas lacking a sufficient water supply and develop publicly accessible fill sites.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Rural Fire Districts	Incomplete	Idaho County Commissioners, Idaho County Disaster Management, NRCS, and Clearwater RC&D	2018
Wildfire	**6.10-87.** Obtain additional training, PPEs, hand tools, and radio equipment for the Carrot Ridge Volunteer Fire Department.	Goal #1,3,5,8, & 10 Priority Ranking: Moderate	Carrot Ridge Volunteer Fire Department	Partially Complete	Idaho County Disaster Management	2017

Table 9.11. Grangeville Mitigation Strategies.

Hazard	Action Item	Goals Addressed	Responsible Departments or Organizations	2015 Status	Potential Resources	Projected Completion Year
Wildfire	**9.11-1.** Continue to develop Idaho County airport in Grangeville to improve functionality and ability to handle supply drops, support wildland firefighting efforts, etc.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County and FAA	Due to be completed in summer of 2015		2015
Severe Weather and Flood	**9.11-2.** Three culverts that cross main (95 and 13, 13 and Hall, and 13 and Meadow) that need inspected and possibly replaced.	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville and ITD	New	Idaho County	Long Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-3.** Emergency backup power supply for City Hall, Police Station, and Fire Department	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville	New	Idaho County Disaster Services	Short Term

Table 9.11. Grangeville Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-4.** Continue developing emergency plans with schools, nursing homes, and hospitals	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Grangeville	New	Idaho County Disaster Services	On-going, annual update
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-5.** Obtain facility, land, and basic equipment for a substation of the Grangeville Rural Fire District in Mount Idaho.	Goal #1,3,5,8, & 10 Priority Ranking: low	Grangeville Rural Fire District	Incomplete	Idaho County Disaster Management	2018
Flood	**9.11-6.** Develop county and city policies to restrict development in flood zone to help prevent losses.	Goal #1,3,5,6, & 8 Priority Ranking: High	City of Grangeville	Incomplete	Idaho County	2018

Table 9.11. Grangeville Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**9.11-7.** Increase County and City of Grangeville participation in National Flood Insurance Program.	Goals #1,3,4,5, & 8 Priority Ranking: High	City of Grangeville	Incomplete	Idaho County	On-going
Flood	**9.11-8.** Request FEMA update of Flood Insurance Rate maps.	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville	Incomplete	Idaho County	2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-9.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5, & 8 Priority Ranking: High	City of Grangeville	Incomplete	Idaho County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going
Flood	**9.11-10.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville	Incomplete	Idaho County Disaster Management.	On going

Table 9.11. Grangeville Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-11.** Update Grangeville's list of available emergency shelters.	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville	Completed (continue)	Idaho County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-12.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-13.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County	Partially completed	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going

Table 9.11. Grangeville Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-14.** Coordinate Grangeville Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville	Partially completed	Idaho County Disaster Management, Idaho Transportation Department and the cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going
Severe Weather	**9.11-15.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Grangeville	Current	Idaho County.	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-16**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout the County and Cities (particularly Cottonwood and Grangeville) for use with a portable generator.	Goal #1,3,5, & 8 Priority Ranking: Moderate	Grangeville Public Works	Incomplete	Idaho County	Immediate Short Term

Table 9.11. Grangeville Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-17.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville	Incomplete	Idaho County Disaster Management	Immediate On-going
Wildfire	**9.11-18.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	Grangeville, local fire district, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going
Floods and Severe Weather	**9.11-19.** Install or replace storm water drains and/or systems where needed throughout Grangeville to help reduce flooding potential.	Goal #1,3,5, & 8 Priority Ranking: High	City of Grangeville	Incomplete	Idaho County Disaster Management	On-going
Wildland Fire	**9.11-20.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9, 10, 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and Grangeville.	On-going

Table 9.11. Grangeville Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood and Earthquake	**9.11-21.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Grangeville	Incomplete	Idaho County Disaster Management	On going
Earthquake	**9.11-22.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5, & 8 Priority Ranking: Low	Grangeville Public Works	Incomplete	Idaho County Disaster Management	Long Term
Wildfire	**9.11-23.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8, 10, & 11 Priority Ranking: High	Local fire department	Partially completed	Idaho County and Grangeville	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.11-24.** Address and obtain funding for fire department resource and capability enhancements through Federal Excess Property program.	Goal #1,3,5, & 8 Priority Ranking: High	Local fire department and district		Idaho County, IDL, BLM, and USFS	On-going

Table 9.12. Ferdinand Mitigation Strategies.

Hazard	Action Item	Goals Addressed	Responsible Departments or Organizations	2015 Status	Potential Resources	Projected Completion Year
Severe Weather, Flood, Wildfire, Earthquake, TCU	**9.12-1.** Backup power supply for municipal water supply.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Ferdinand	Incomplete	City of Cottonwood and Idaho County Disaster Services	Long Term
Flood	**9.12-2.** Develop city policies to restrict development in flood zone to help prevent losses.	Goal # 1,3,5,6, & 8 Priority Ranking: High	City of Ferdinand	Incomplete	Idaho County	2018
Flood	**9.12-3.** Increase County and City of Ferdinand participation in National Flood Insurance Program.	Goals #1,3,5, & 8 Priority Ranking: High	City of Ferdinand	Incomplete	Idaho County	On-going

Table 9.12. Ferdinand Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**9.12-4.** Request FEMA update of Flood Insurance Rate maps.	Goal # 1,3,5, & 8 Priority Ranking: High	City of Ferdinand	Incomplete	Idaho County	2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-5.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5, & 8 Priority Ranking: High	City of Ferdinand	Incomplete	Idaho County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going
Flood	**9.12-6.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5, & 8 Priority Ranking: High	City of Ferdinand	Incomplete	Idaho County Disaster Management.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-7.** Update City's list of available emergency shelters.	Goal #1,3,5, & 8 Priority Ranking: High	City of Ferdinand	Completed (continue)	Idaho County Disaster Management	On going

Table 9.12. Ferdinand Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-8.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Ferdinand	Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-9.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Partially completed	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-10.** Coordinate Ferdinand Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal # Priority Ranking: High	Idaho County Disaster Management	Partially completed	Idaho Transportation Department and the cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going

Table 9.12. Ferdinand Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather	**9.12-11.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Ferdinand	Current	Idaho County Disaster Management	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-12**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout Ferdinand for use with a portable generator.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Ferdinand	Incomplete	Idaho County Disaster Management and local fire district.	Immediate Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-13.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5, & 8 Priority Ranking: High	City of Ferdinand	Incomplete	Idaho County Disaster Management	Immediate On-going
Wildfire	**9.12-14.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Ferdinand, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going

Table 9.12. Ferdinand Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Floods and Severe Weather	**9.12-15.** Install or replace storm water drains and/or systems where needed throughout Ferdinand to help reduce flooding potential.	Goal #1,3,5, & 8 Priority Ranking: High	City of Ferdinand	Incomplete	Idaho County	On-going
Wildland Fire	**9.12-16.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and city of Ferdinand	On-going
Flood and Earthquake	**9.12-17.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Ferdinand	Incomplete	Idaho County	On going
Earthquake	**9.12-18.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5, & 8 Priority Ranking: Low	Ferdinand Public Works	Incomplete	Idaho County	Long Term

Table 9.12. Ferdinand Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**9.12-19.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8,9, & 10 Priority Ranking: High	Local fire departments/district	Partially completed	Idaho County and City of Ferdinand	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.12-20.** Address and obtain funding for fire department resource and capability enhancements through Federal Excess Property program.	Goal #1,3,5, & 8 Priority Ranking: High	Local fire department/ districts		Idaho County, City of Ferdinand, IDL, BLM, and USFS	On-going

Table 9.13. Cottonwood Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, Wildfire, Earthquake, TCU	**9.13-1.** Obtain backup generators for primary well head and Fire Department in Cottonwood.		City of Cottonwood	Completed		
Severe Weather, Flood, Wildfire, Earthquake, TCU	**9.13-2.** Establish backup power supply for city hall, community center	Goal #1,3,5,8, & 9 Priority Ranking: Moderate	City of Cottonwood	New	Idaho County Disaster Services	Long Term
Flooding	**9.13-3.** Planning and engineering solutions for flooding in downtown area.	Goal #1,3,5,8, & 9 Priority Ranking: Moderate	City of Cottonwood	New	Idaho County Disaster Services	Long Term

Table 9.13. Cottonwood Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**9.31-4.** Obtain additional training, PPEs, hand tools, portable radios, communications base station, and a Type 1 crew cab engine for the Cottonwood Volunteer Fire Department and Rural Fire District.	Goal #1,3,5, & 8 Priority Ranking: Moderate	Cottonwood Volunteer Fire Department and Cottonwood Rural Fire District	Partially Complete	Cottonwood City Council	2017
Flood	**9.13-5.** Develop county and city policies to restrict development in flood zone to help prevent losses.	Goal #1,3,5,6, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County	2018
Flood	**9.13-6.** Increase County and City of Cottonwood participation in National Flood Insurance Program.	Goals #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County	On-going
Flood	**9.13-7.** Request FEMA update of Flood Insurance Rate maps.	Goal # 1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County	2018

Table 9.13. Cottonwood Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-8.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going
Flood	**9.13-9.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County Disaster Management.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-10.** Update City's list of available emergency shelters.	Goal #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Completed (continue)	Idaho County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-11.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County Disaster Management	Short Term

Table 9.13. Cottonwood Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-12.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Partially completed	Idaho County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-13.** Coordinate Cottonwood Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Partially completed	Idaho Transportation Department and Idaho County Disaster Management	On going
Severe Weather	**9.13-14.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Cottonwood	Current	Idaho County Disaster Management	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-15**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout the County and Cities (particularly Cottonwood and Grangeville) for use with a portable generator.	Goal #1,3,5,8, & 9 Priority Ranking: Moderate	City of Cottonwood	Incomplete	Idaho County	Immediate Short Term

Table 9.13. Cottonwood Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-16.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County Disaster Management	Immediate On-going
Wildfire	**9.13-17.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5,8,9, 10, & 11 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Cottonwood, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going
Floods and Severe Weather	**9.13-18.** Install or replace storm water drains and/or systems where needed throughout the County and Cities to help reduce flooding potential.	Goal #1,3,5, & 8 Priority Ranking: High	City of Cottonwood	Incomplete	Idaho County	On-going

Table 9.13. Cottonwood Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildland Fire	**9.13-19.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9, 10, & 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and City of Cottonwood	On-going
Flood and Earthquake	**9.13-20.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Cottonwood	Incomplete	Idaho County	On going
Earthquake	**9.13-21.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5,8, & 9 Priority Ranking: Low	City of Cottonwood	Incomplete	Idaho County	Long Term
Wildfire	**9.13-22.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8, & 9 Priority Ranking: High	Local fire department/ district	Partially completed	Idaho County	On going

Table 9.13. Cottonwood Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-23.** Address and obtain funding for fire department resource and capability enhancements through the Federal Excess Property program.	Goal #1,3,5, & 8 Priority Ranking: High	Local fire departments and districts	Incomplete	Idaho County, IDL, BLM, & USFS	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.13-24.** Support continued development of Cottonwood's school district's Emergency Response Plans.	Goal #1,3,5, & 8 Priority Ranking: High	Cottonwood Joint District #242	Partially completed	Idaho County Disaster Management	Short Term

Table 9.14. Riggins Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Landslide	**9.14-1.** Continue improvement of Salmon River Road to help prevent slides and improve safety.	Goal #1,3,5, & 8 Priority Ranking: Moderate	Idaho County Road and Bridge	Incomplete	City of Riggins	Long Term
General	**9.14-2.** Obtain backup power supply for Riggins cellular tower and improve redundancy of land line.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Riggins	Incomplete	Idaho County	Short Term
Earthquake	**9.14-3.** Evaluate Race Creek bridge to insure seismic stability.	Goal #1,3,5,8, & 9 Priority Ranking: High	Idaho County Road and Bridge	Incomplete	City of Riggins	Short Term
Flood	**9.14-4.** Develop city policies to restrict development in flood zone to help prevent losses.	Goal #1,3,5,6, & 8 Priority Ranking: High	City of Riggins	Incomplete	Idaho County	2018

Table 9.14. Riggins Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**9.14-5.** Increase City of Riggins participation in National Flood Insurance Program.	Goals #1,3,5, & 8 Priority Ranking: High	City of Riggins	Incomplete	Idaho County	On-going
Flood	**9.14-6.** Request FEMA update of Flood Insurance Rate maps.	Goal #1,3,5, & 8 Priority Ranking: High	City of Riggins	Incomplete	Idaho County	2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-7.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5, & 8 Priority Ranking: High	City of Riggins	Incomplete	Idaho County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going
Flood	**9.14-8.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5, & 8 Priority Ranking: High	City of Riggins	Incomplete	Idaho County Disaster Management.	On going

Table 9.14. Riggins Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-9.** Update Riggins' list of available emergency shelters.	Goal #1,3,5, & 8 Priority Ranking: High	City of Riggins	Completed (continue)	Idaho County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-10.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5, & 8 Priority Ranking: High	City of Riggins	Incomplete	Idaho County Disaster Management	Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-11.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County	Partially completed	City of Riggins	On going

Table 9.14. Riggins Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-12.** Coordinate Riggins Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5, & 8 Priority Ranking: High	City of Riggins	Partially completed	Idaho Transportation Department and Idaho County Disaster Management	On going
Severe Weather	**9.14-13.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5, & 8 Priority Ranking: Moderate	Idaho County	Current	City of Riggins	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-14**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout Riggins for use with a portable generator.	Goal #1,3,5,8, & 9 Priority Ranking: Moderate	City of Riggins	Incomplete	Idaho County	Immediate Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-15.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Riggins	Immediate On-going

Table 9.14. Riggins Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**9.14-16.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Riggins, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going
Floods and Severe Weather	**9.14-17.** Install or replace storm water drains and/or systems where needed throughout the County and Cities to help reduce flooding potential.	Goal #1,3,5, & 8 Priority Ranking: High	City of Riggins	Incomplete	Idaho County	On-going
Wildland Fire	**9.14-18.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and cities of; Stites, Ferdinand, Riggins, White Bird, Kooskia Cottonwood, Kamiah, and Grangeville.	On-going

Table 9.14. Riggins Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood and Earthquake	**9.14-19.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5, & 8 Priority Ranking: Moderate	City of Riggins	Incomplete	Idaho County	On going
Earthquake	**9.14-20.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5, & 8 Priority Ranking: Low	Idaho County	Incomplete	City of Riggins.	Long Term
Wildfire	**9.14-21.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8 & 9 Priority Ranking: High	City of Riggins	Partially completed	Idaho County Rural Fire Districts	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.14-22.** Address and obtain funding for fire department resource and capability enhancements through Federal Excess Property program.	Goal # Priority Ranking: High	Local fire departments and districts		Idaho County, IDL, BLM, and USFS	On-going

Table 9.15. Stites Mitigation Strategies.

Hazard	Action Item	Goals Addressed	Responsible Departments or Organizations	2015 Status	Potential Resources	Projected Completion Year
Wildfire	**9.15-1.** Obtain or construct fire station for the Stites Fire Department, and provide training. Acquire updated rolling stock, P25 radios, PPEs, tools, and miscellaneous other equipment.	Goal #1,3,5,8 & 10 Priority Ranking: Moderate	Stites Fire Department	Incomplete	Idaho County, IDL, BLM, and USFS	2018
Flood	**9.15-2.** Develop county and city policies to restrict development in flood zone to help prevent losses.	Goal #1,3,5,8 & 9 Priority Ranking: High	City of Stites	Incomplete	Idaho County	2018
Flood	**9.15-3.** Increase County and City of Stites participation in National Flood Insurance Program.	Goals #1,3,5, & 8 Priority Ranking: High	City of Stites	Incomplete	Idaho County	On-going
Flood	**9.15-4.** Request FEMA update of Flood Insurance Rate maps.	Goal #1,3,5, & 8 Priority Ranking: High	City of Stites	Incomplete	Idaho County	2018

Table 9.15. Stites Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-5.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5, & 8 Priority Ranking: High	City of Stites	Incomplete	Idaho County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going
Flood	**9.15-6.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5, & 8 Priority Ranking: High	City of Stites	Incomplete	Idaho County Disaster Management.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-7.** Update Stites' list of available emergency shelters.	Goal #1,3,5, & 8 Priority Ranking: High	City of Stites	Completed (continue)	Idaho County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-8.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Stites	Short Term

Table 9.15. Stites Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-9.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County	Partially completed	Cities of; Stites, Ferdinand, Riggins, White Bird, Cottonwood, Grangeville, Kamiah, and Kooskia.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-10.** Coordinate Stites Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5, & 8 Priority Ranking: High	City of Stites	Partially completed	Idaho Transportation Department and Idaho County Disaster Management	On going
Severe Weather	**9.15-11.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5, & 8 Priority Ranking: Moderate	Idaho County	Current	City of Stites	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-12**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout the City for use with a portable generator.	Goal #1,3,5,8 & 9 Priority Ranking: Moderate	City of Stites	Incomplete	Idaho County	Immediate Short Term

Table 9.15. Stites Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-13.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5,8 & 9 Priority Ranking: High	City of Stites	Incomplete	Idaho County Disaster Management	Immediate On-going
Wildfire	**9.15-14.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County	Incomplete	City of Stites, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going
Floods and Severe Weather	**9.15-15.** Install or replace storm water drains and/or systems where needed throughout the City to help reduce flooding potential.	Goal #1,3,5,8 & 9 Priority Ranking: High	City of Stites	Incomplete	Idaho County	On-going
Wildland Fire	**9.15-16.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and City of Stites	On-going

Table 9.15. Stites Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood and Earthquake	**9.15-17.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5,8 & 9 Priority Ranking: Moderate	City of Stites	Incomplete	Idaho County	On going
Earthquake	**9.15-18.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5,8 & 9 Priority Ranking: Low	City of Stites	Incomplete	Idaho County	Long Term
Wildfire	**9.15-19.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8 & 9 Priority Ranking: High	Local fire department/ district	Partially completed	Idaho County and City of Stites	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.15-20.** Address and obtain funding for fire department resource and capability enhancements through Federal Excess Property program.	Goal #1,3,5, & 8 Priority Ranking: High	Local fire departments and districts	Incomplete	Idaho County, IDL, BLM, and USFS	On-going

Table 9.16. Kamiah Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
General	**9.16-1.** Obtain and install a transfer switch for the backup generator at Kamiah High School.	Goal #1,3,5,8 & 9 Priority Ranking: Moderate	School District #304	Incomplete	City of Kamiah	Immediate
Flood	**9.16-2.** Continue to develop, fund, and implement flood control measures on Lawyer Creek near Kamiah.	Goal #1,3,5,8 & 9 Priority Ranking: Moderate	City of Kamiah	Incomplete	Idaho County and Lewis County	Immediate On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-3.** Obtain additional personnel, training, PPEs, hand tools, portable and mobile radios, two structural engines, one utility vehicle, and miscellaneous other equipment for the Kamiah City and Rural Fire Protection District.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Kamiah City and Rural Fire Protection District	Partially Complete	Idaho County and Lewis County	On-going

Table 9.16. Kamiah Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**9.16-4.** Develop city policies to restrict development in flood zone to help prevent losses.	Goal #1,3,5,6 & 8 Priority Ranking: High	City of Kamiah	Incomplete	Idaho County and Lewis County	2018
Flood	**9.16-5.** Increase City of Kamiah participation in National Flood Insurance Program.	Goals #1,3,5 & 8 Priority Ranking: High	City of Kamiah	Incomplete	Idaho County and Lewis County	On-going
Flood	**9.16-6.** Request FEMA update of Flood Insurance Rate maps.	Goal # 1,3,5 & 8 Priority Ranking: High	City of Kamiah	Incomplete	Idaho County and Lewis County	2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-7.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5 & 8 Priority Ranking: High	City of Kamiah	Incomplete	Idaho County, Lewis County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going

Table 9.16. Kamiah Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**9.16-8.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5,6 & 8 Priority Ranking: High	City of Kamiah	Incomplete	Idaho and Lewis County Disaster Management.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-9.** Update City's list of available emergency shelters.	Goal #1,3,5 & 8 Priority Ranking: High	City of Kamiah	Completed (continue)	Idaho and Lewis County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-10.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Kamiah	Short Term

Table 9.16. Kamiah Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-11.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County	Partially completed	City of Kamiah and Lewis County	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-12.** Coordinate Kamiah Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5 & 8 Priority Ranking: High	City of Kamiah	Partially completed	Idaho Transportation Department, Idaho and Lewis County Disaster Management	On going
Severe Weather	**9.16-13.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Idaho County	Current	City of Kamiah and Lewis County	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-14**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout Kamiah for use with a portable generator.	Goal #1,3,5, 8 & 9 Priority Ranking: Moderate	City of Kamiah	Incomplete	Idaho and Lewis County	Immediate Short Term

Table 9.16. Kamiah Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-15.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5, 8 & 9 Priority Ranking: High	City of Kamiah	Incomplete	Idaho and Lewis County Disaster Management	Immediate On-going
Wildfire	**9.16-16.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5, 8, 9, 10 & 11 Priority Ranking: High	Idaho County	Incomplete	City of Kamiah, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going
Floods and Severe Weather	**9.16-17.** Install or replace storm water drains and/or systems where needed throughout Kamiah to help reduce flooding potential.	Goal #1,3,5, 8 & 9 Priority Ranking: High	City of Kamiah	Incomplete	Idaho and Lewis County	On-going

Table 9.16. Kamiah Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildland Fire	**9.16-18.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5, 8, 9, 10 & 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho and Lewis County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and City of Kamiah.	On-going
Flood and Earthquake	**9.16-19.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5, 8 & 9 Priority Ranking: Moderate	City of Kamiah	Incomplete	Idaho and Lewis County	On going
Earthquake	**9.16-20.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5, 8 & 9 Priority Ranking: Low	City of Kamiah	Incomplete	Idaho and Lewis County	Long Term
Wildfire	**9.16-21.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5, 8 & 9 Priority Ranking: High	Local fire departments	Partially completed	Idaho County and City of Kamiah	On going

Table 9.16. Kamiah Mitigation Strategies.						
Hazard	Action Item	Goals Addressed	Responsible Departments or Organizations	2015 Status	Potential Resources	Projected Completion Year
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.16-22.** Address and obtain funding for fire department resource and capability enhancements through the Federal Excess Property program.	Goal # Priority Ranking: High	Local fire department/ district		Idaho and Lewis County, IDL, BLM, and USFS	On-going

Table 9.17. Kooskia Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildfire	**9.17-1.** Obtain updated rolling stock, portable pump, hand tools, PPE, handheld radios, and other miscellaneous equipment for the Kooskia Volunteer Fire Department.	Goal #1,3,5, 8 & 10 Priority Ranking: Moderate	Kooskia VFD	Partially Complete	Idaho, IDL, BLM, and USFS	2017
Flood	**9.17-2.** Develop city policies to restrict development in flood zone to help prevent losses.	Goal #1,3,5,6, & 8 Priority Ranking: High	City of Kooskia	Incomplete	Idaho County	2018
Flood	**9.17-3.** Increase City of Kooskia participation in National Flood Insurance Program.	Goals #1,3,5 & 8 Priority Ranking: High	City of Kooskia	Incomplete	Idaho County	On-going
Flood	**9.17-4.** Request FEMA update of Flood Insurance Rate maps.	Goal #1,3,5 & 8 Priority Ranking: High	City of Kooskia	Incomplete	Idaho County	2018

Table 9.17. Kooskia Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-5.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5 & 8 Priority Ranking: High	City of Kooskia	Incomplete	Idaho County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going
Flood	**9.17-6.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5 & 8 Priority Ranking: High	City of Kooskia	Incomplete	Idaho County Disaster Management.	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-7.** Update City's list of available emergency shelters.	Goal #1,3,5 & 8 Priority Ranking: High	City of Kooskia	Completed (continue)	Idaho County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-8.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5 & 8 Priority Ranking: High	City of Kooskia	Incomplete	Idaho County Disaster Management	Short Term

Table 9.17. Kooskia Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-9.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County	Partially completed	City of Kooskia	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-10.** Coordinate Kooskia Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5 & 8 Priority Ranking: High	City of Kooskia	Partially completed	Idaho Transportation Department and Idaho County Disaster Management	On going
Severe Weather	**9.17-11.** Continue participation in StormReady program and recertify every third year.	Goal #1,3,5 & 8 Priority Ranking: Moderate	Idaho County	Current	City of Kooskia	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-12**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout the City of Kooskia for use with a portable generator.	Goal #1,3,5, 8 & 9 Priority Ranking: Moderate	City of Kooskia	Incomplete	Idaho County Disaster Management	Immediate Short Term

Table 9.17. Kooskia Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-13.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5 & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of Kooskia.	Immediate On-going
Wildfire	**9.17-14.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County	Incomplete	City of Kooskia, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going
Floods and Severe Weather	**9.17-15.** Install or replace storm water drains and/or systems where needed throughout the County and Cities to help reduce flooding potential.	Goal #1,3,5 & 8 Priority Ranking: High	City and Kooskia	Incomplete	Idaho County	On-going
Wildland Fire	**9.17-16.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and City of Kooskia	On-going

Table 9.17. Kooskia Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood and Earthquake	**9.17-17.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5,8 & 9 Priority Ranking: Moderate	City of Kooskia	Incomplete	Idaho County	On going
Earthquake	**9.17-18.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5,8 & 9 Priority Ranking: Low	City of Kooskia	Incomplete	Idaho County	Long Term
Wildfire	**9.17-19.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8 & 9 Priority Ranking: High	Local fire department/ district	Partially completed	Idaho County and City of Kooskia	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.17-20.** Address and obtain funding for fire department resource and capability enhancements through the Federal Excess Property program.	Goal #1,3,5, & 8 Priority Ranking: High	Local fire department/ district		Idaho County, City of Kooskia, IDL, BLM and USFS	On-going

Table 9.18. White Bird Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**9.18-1.** Identify mitigation and maintenance measures deemed appropriate for the White Bird levee and seek appropriate implementation funding.	Goal #1,3,5,8 & 9 Priority Ranking: High	Flood District #6	Incomplete	Idaho County Disaster Service	Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-2.** Construct a new two story building to house equipment and provide a training facility for firefighters. Acquire everything required to operate an effective fire department including two structural engines, one brush truck, a water tender, hand and shop tools, PPE's, hoses, nozzles, foam capabilities, etc.	Goal #1,3,5,8 & 9 Priority Ranking: High	White Bird Volunteer Fire Department	Incomplete	Idaho County Rural Fire Districts	2020
Flood	**9.18-3.** Develop city policies to restrict development in flood zone to help prevent losses.	Goal #1,3,5,6, & 8 Priority Ranking: High	City of White Bird	Incomplete	Idaho County	2018

Table 9.18. White Bird Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Flood	**9.18-4.** Increase City of White Bird participation in National Flood Insurance Program.	Goals #1,3,5,8 & 9 Priority Ranking: High	City of White Bird	Incomplete	Idaho County	On-going
Flood	**9.18-5.** Request FEMA update of Flood Insurance Rate maps.	Goal #1,3,5, & 8 Priority Ranking: High	City of White Bird	Incomplete	Idaho County	2018
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-6.** Develop and deliver public education programs on hazard mitigation.	Goal #1,3,4,5, & 8 Priority Ranking: High	City of White Bird	Incomplete	Idaho County, USFS, BLM, IDL, Public Health Dept, fire depts., and local schools.	On-going
Flood	**9.18-7.** Improve program application and coordination with county floodplain ordinance.	Goal #1,3,5, & 8 Priority Ranking: High	City of White Bird	Incomplete	Idaho County Disaster Management.	On going

Table 9.18. White Bird Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-8.** Update City's list of available emergency shelters.	Goal #1,3,5, & 8 Priority Ranking: High	City of White Bird	Completed (continue)	Idaho County Disaster Management	On going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-9.** Develop action plan for dealing with special needs populations during emergencies.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County Disaster Management	Incomplete	City of White Bird	Short Term
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-10.** Develop hazard event communication and coordination strategy with all municipalities and jurisdictions in Idaho County.	Goal #1,3,5, & 8 Priority Ranking: High	Idaho County	Partially completed	City of White Bird	On going

Table 9.18. White Bird Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-11.** Coordinate White Bird Evacuation Plan with existing Plan developed by the Idaho Transportation Department acknowledging the lack of alternate routes in many communities.	Goal #1,3,5, & 8 Priority Ranking: High	City of White Bird	Partially completed	Idaho Transportation Department and Idaho County Disaster Management	On going
Severe Weather	**9.18-12.** Continue participation in StormReady program and recertify every third year.	Goal # 1,3,5, & 8 Priority Ranking: Moderate	Idaho County	Current	City of White Bird	On-going
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-13**. Identify, assess, and hardwire most appropriate critical facilities and shelters throughout the City of White Bird for use with a portable generator.	Goal #1,3,5,8 & 9 Priority Ranking: Moderate	City of White Bird	Incomplete	Idaho County	Immediate Short Term

Table 9.18. White Bird Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-14.** Identify and promote the acquisition of necessary resources designed to protect critical facilities from hazards and enhance sheltering capacity and capability.	Goal #1,3,5,8 & 9 Priority Ranking: High	City of White Bird	Incomplete	Idaho County Disaster Management	Immediate On-going
Wildfire	**9.18-15.** Plan, fund, and implement home and community defensible space and hazardous fuels reduction projects.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County	Incomplete	City of White Bird, local fire districts, Bureau of Land Management, US Forest Service, and Idaho Department of Lands.	Immediate On-going
Floods and Severe Weather	**9.18-16.** Install or replace storm water drains and/or systems where needed throughout the City to help reduce flooding potential.	Goal #1,3,5,8 & 9 Priority Ranking: High	City of White Bird	Incomplete	Idaho County	On-going

Table 9.18. White Bird Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Wildland Fire	**9.18-17.** Plan, fund, and implement fuels reduction projects along roads, power lines, municipal watersheds, and other infrastructural components.	Goal #1,3,5,8,9, 10 & 11 Priority Ranking: High	Idaho County Fire Mitigation Committee	Incomplete	Idaho County, utility companies, Bureau of Land Management, US Forest Service, Idaho Department of Lands, and City of White Bird	On-going
Flood and Earthquake	**9.18-18.** Assess location and stability of well intakes located in the flood zone. Reinforce well intakes where needed.	Goal #1,3,5,8 & 9 Priority Ranking: Moderate	City of White Bird	Incomplete	Idaho County	On going
Earthquake	**9.18-19.** Inspect highest risk public buildings for unreinforced masonry and seismic stability. Retrofit as is deemed necessary.	Goal #1,3,5,8 & 9 Priority Ranking: Low	City of White Bird	Incomplete	Idaho County	Long Term
Wildfire	**9.18-20.** Assess and replace inadequate water main lines where needed to improve fire protection capabilities.	Goal #1,3,5,8,9 & 10 Priority Ranking: High	Local fire department/ district	Partially completed	Idaho County and City of White Bird	On going

Table 9.18. White Bird Mitigation Strategies.						
Hazard	**Action Item**	**Goals Addressed**	**Responsible Departments or Organizations**	**2015 Status**	**Potential Resources**	**Projected Completion Year**
Severe Weather, Flood, TCU, Wildfire, Earthquake, and Landslide	**9.18-21.** Address and obtain funding for fire department resource and capability enhancements through the Federal Excess Property program.	Goal #1,3,5,8 & 10 Priority Ranking: High	Local fire department/ and district		Idaho County, City of White Bird, IDL, BLM and USFS	On-going

Proposed Defensible Space Projects

Table 9.19. Proposed Defensible Space Projects.

Map Id#	Project Name	# of Acres	Priority
1	American River Community Protection Area	4,578	High
2	Brugdorf Defensible Space Treatment	4,985	High
3	Cedar Creek Defensible Space Treatment	3,125	High
4	Christie Creek Defensible Space Treatment	6,945	High
5	Clear Creek Road Defensible Space Treatment	1,276	High
6	Clearwater Community Defensible Space Treatment	1,045	High
7	Clearwater Community Defensible Space Treatment	854	High
8	Cove Road Defensible Space Treatment	360	High
9	Dixie Community Defensible Space Treatment	2,078	High
10	Doumecq Grade Defensible Space Treatment	1,218	High
11	Dutch Oven Community Protection Area	10,361	High
12	Elk Creek Watershed Management Plan Area	14,150	High
13	Elk City Fuels Treatment Area	TBD	High
14	Fish Hatchery Defensible Space Treatment	379	High
15	Glenwood-Caribel Fuels Treatment Area	1,837	High
16	Grangeville Watershed Fuels Treatment	650	High
17	Harpster Community Defensible Space Treatment	2,087	High
18	Harpster Community Defensible Space Treatment	308	High
19	Harpster Community Defensible Space Treatment	255	High
20	Hwy 12 Kooskia-Kamiah Defensible Space Treatment	366	High
21	Kamiah Fuels Treatment	TBD	High
22	Kidder Ridge East Defensible Treatment	133	High

Table 9.19. Proposed Defensible Space Projects.			
Map Id#	**Project Name**	**# of Acres**	**Priority**
23	Kidder Ridge West Defensible Space Treatment	122	High
24	Kooskia SE Defensible Space Fuels Treatment	68	High
25	Kooskia SW Defensible Space Treatment	68	High
26	Leitch Creek Defensible Space Treatment	364	High
27	Lowell Community Defensible Space Treatment	41	High
28	Lowell Community Defensible Space Treatment	24	High
29	Lowell Community Defensible Space Treatment	22	High
30	Lower S. Fork Salmon River Defensible Space Treatment	290	High
31	Old White Bird Grade Community Protection Area	1,193	High
32	Pardee Defensible Space Project Area	588	High
33	Powell Fuels Treatment	TBD	High
34	Red Pine Creek Defensible Space Treatment Area	2,179	High
35	Ridge Runner Defensible Space Treatment Area	912	High
36	Ridge Runner Defensible Space Treatment Area	200	High
37	Ridge Runner Defensible Space Treatment Area	4,237	High
38	Ridge Runner Defensible Space Treatment Area	3,174	High
39	Salmon River Red Zone Defensible Space Treatment	8,741	High
40	Smith Creek Defensible Space Treatment	248	High
41	Stites Defensible Space Fuels Treatment	112	High
42	Tram Road Defensible Space Treatment	125	High
43	Warren Defensible Space Treatment	880	High
44	Wilson Creek Defensible Space Treatment	319	High

Proposed Roadside Fuel Reduction Projects

Table 9.20. Proposed Roadside Fuel Reduction Projects.				
Map Id#	**Project Name**	**Miles**	**# of Acres**	**Priority**
1	Adams Grade Roadside Treatment Area	3.8	368.8	High
2	Beaver Slide Roadside Treatment Area	7.3	682.3	High
3	Big Cedar Roadside Treatment Area	7.59	759.36	High
4	Big Horse Canyon Roadside Treatment Area	3.4	333.62	High
5	Clear Creek Roadside Treatment Area	10.8	1,057.50	High
6	Crane Hill Roadside Treatment Area	2.72	278.02	High
7	Dixie Roadside Fuels Treatment	31.4	3,026.5	High
	Doughty Roadside Treatment Area	1.17	125.12	High
	Elk City to Grangeville Roadside Treatment Area	34.4	3,338.5	High
	French Creek-Warren Roadside Treatment Area	40.2	3,667.5	High
	Harpster Area Roadside Fuels Treatment Area	8.5	830.8	High
	Harris Ridge Roadside Treatment Area	12.8	1,207.4	High
	Kidder Ridge Roadside Treatment Area	11	1,036.5	High
	Leitch Creek Roadside Treatment Area	4.7	464	High
	Long Bluff Roadside Treatment Area	1.15	125.9	High
	Mallard Creek Roadside Fuels Treatment Area	17.9	1,580.3	High
	Mt. Idaho-Harpster Grade Roadside Treatment Area	19.1	1,855.9	High
	Mulledy Roadside Treatment Area	1.91	198.7	High
	Newsome Roadside Fuels Treatment Area	6.8	656.3	High
	Pardee Roadside Treatment Area	7.1	586.4	High
	Red Fir Roadside Treatment Area	5.38	535.95	High
	RR Hot Springs Roadside Fuels Treatment Area	10	979.2	High

Table 9.20. Proposed Roadside Fuel Reduction Projects.				
Map Id#	**Project Name**	**Miles**	**# of Acres**	**Priority**
	Sally Ann Creek Roadside Treatment Area	3.7	369	High
	Sutter Creek Roadside Treatment Area	6.2	599.5	High
	Tom Taha Roadside Treatment Area	6	590.7	High
	Trenary Roadside Treatment Area	0.96	107.69	High
	Wall Creek Roadside Treatment Area	4.7	445.4	High
	Whitewater Wilderness Ranch Roadside Treatment Area	6	109.1	High
	Wilson Roadside Treatment Area	2.38	245.45	High
	Woodland Grade Roadside Treatment Area	10	913.6	High
	Woodland Roadside Treatment Area	12.4	1,139	High

List of Tables and Figures

List of Tables

Table 3.1. Land Ownership Categories in Idaho County.........35
Table 3.2. Historical and Current Population by Community.........36
Table 3.3. Vegetative Cover Types in Idaho County.........37
Table 4.1. Second-Order Hazards Related to Flood Events.........50
Table 4.2. NFIP Policy Statistics as of 4/12/2015 in Idaho County.........53
Table 5.1. Second-Order Hazards Related to Earthquake Events.........97
Table 5.2. Earthquake Probability in Idaho County.........99
Table 5.3. Summary of Utility System Damage from HAZUS.........101
Table 6.1. Landslide Disaster Declarations in 1976-2000.........111
Table 6.2. Second-Order Hazards Related to Landslide Events.........112
Table 6.3. Landslide Impact Zones in Idaho County.........119
Table 7.1. Weather Data for Idaho County.........137
Table 7.2. Second-Order Hazards Related to Severe Weather Events.........140
Table 8.1. Statistical Highlights of Wildfires from 2004 -2014 Nationally.........169
Table 8.2. Summary of National Ignitions and Acres Burned Annually (1980-2014).........169
Table 8.3. Historic Fire Regimes in Idaho County.........171
Table 8.4. Fire Regime Condition Class in Idaho County.........174
Table 8.5. Second-Order Hazards Related to Wildland Fire Events.........180
Table 8.6. Summary of Federal and State databases 1980-2013.........183
Table 8.7. Summary of Cause from State and Federal databases 1980-2014.........184
Table 9.1. Idaho County Local Mitigation Capability Assessment.........220
Table 9.2. Cottonwood Local Mitigation Capability Assessment.........222
Table 9.3. Ferdinand Local Mitigation Capability Assessment.........224
Table 9.4. Grangeville Local Mitigation Capability Assessment.........226
Table 9.5. Kamiah Local Mitigation Capability Assessment.........228
Table 9.6. Kooskia Local Mitigation Capability Assessment.........229
Table 9.7. Riggins Local Mitigation Capability Assessment.........231
Table 9.8. Stites Local Mitigation Capability Assessment.........233
Table 9.9. White Bird Local Mitigation Capability Assessment.........235
Table 9.10. Idaho County Mitigation Strategies.........239
Table 9.11. Grangeville Mitigation Strategies.........266
Table 9.12. Ferdinand Mitigation Strategies.........273
Table 9.13. Cottonwood Mitigation Strategies.........279
Table 9.14. Riggins Mitigation Strategies.........286

Table 9.15. Stites Mitigation Strategies. 292
Table 9.16. Kamiah Mitigation Strategies. 297
Table 9.17. Kooskia Mitigation Strategies. 304
Table 9.18. White Bird Mitigation Strategies. 309
Table 9.19. Proposed Defensible Space Projects. 316
Table 9.20. Proposed Roadside Fuel Reduction Projects. 318

List of Figures

Figure 2.1. Press Release #1 – Planning Process Announcement. 25
Figure 2.2. Press Release #2 - Public Meeting Flyer. 26
Figure 2.3. Press Release #3 – Public Comment Period. 28
Figure 3.1. Annual Building Permits from 1997 to 2012. 36
Figure 3.2. Economic Losses from Hazard Events 42
Figure 3.3. Summary of Property Damages in the SHELDUS Hazard Profile.[10] 42
Figure 3.4. Summary of Crop Damages in the SHELDUS Hazard Profile.[10] 43
Figure 4.1. Idaho County FEMA Floodplain Map. 52
Figure 4.2. Floodzones for unincorporated parts of Idaho County. 53
Figure 4.3. Floodzone for Grangeville 62
Figure 4.4. Floodzone for Cottonwood. 68
Figure 4.5. Floodzone for Riggins. 72
Figure 4.6. Floodzone for Stites. 76
Figure 4.7. Floodzone for Kamiah. 80
Figure 4.8. Floodzone for Kooskia. 84
Figure 4.9. Floodzone for White Bird 88
Figure 5.1. Idaho Seismic Activity Map for 2014. 95
Figure 5.2. Seismic Shaking Hazard for Idaho County 98
Figure 6.1. Landslide Prone Landscapes Map of Idaho County. 114
Figure 6.2. Pollock Landslide Impact Zone 115
Figure 6.3. County Landslide Impact Zones. 117
Figure 6.4. Riggins Landslide Impact Zone 122
Figure 6.5. Stites Landslide Impact Zone. 124
Figure 6.6. Kamiah Landslide Impact Zone. 126
Figure 6.7. Kooskia Landslide Impact Zone. 128
Figure 7.1. Average Annual Precipitation in Idaho from 1971 to 2000. 135
Figure 7.2. Idaho Average Wind Speed Map. 136
Figure 7.3. United States Drought Monitor for July 14, 2015. 139
Figure 8.1. Historic Fire Regime for Idaho County 172
Figure 8.2. Fire Regime Condition Class Map for Idaho County. 175
Figure 8.3. Wildland Urban Interface in Idaho County, Idaho. 179
Figure 8.4. Summary of Idaho County State and Federal Acres Burned. 186
Figure 8.5. Summary of State and Federal Annual Ignitions 1980-2013 186

This plan was prepared by Northwest Management, Inc. under contract with Idaho County Disaster Management.

Copies of this Plan can be obtained by contacting:

Idaho County Disaster Management Coordinator
Idaho County Disaster Management Office
Idaho County Courthouse
320 West Main Street
Grangeville, Idaho 83530

Citation of this work:

Tucker, Brad and T. Luke. *Lead Authors.* Idaho County, Idaho Multi-Hazard Mitigation Plan – 2015 Revision. Northwest Management, Inc., Moscow, Idaho. 2015. Pp 328.

Northwest Management, Inc.
233 East Palouse River Drive
PO Box 9748
Moscow ID 83843

208-883-4488 Telephone
208-883-1098 Fax
NWManage@consulting-foresters.com
http://www.Consulting-Foresters.com/